



Sun StorageTek™ SL500

Modular Library System

Systems Assurance Guide

MT9212
Revision: MB



Sun StorageTek™ SL500 Modular Library System

Systems Assurance Guide

Sun Microsystems, Inc.
www.sun.com

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October 2008, Revision MB

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Summary of Changes

Date	Revision	Description
August 2004	A	Initial Release
January 2005	B	See this revision for details.
February 2005	C	See this revision for details.
March 2005	D	See this revision for details.
May 2005	E	See this revision for details.
August 2005	F	See this revision for details.
November 2005	G	See this revision for details.
February 2006	H	See this revision for details.
June 2006	J	See this revision for details.
August 2006	K	See this revision for details.
October 2006	L	See this revision for details.
May 2007	M	See this revision for details.
July 2008	MA	See this revision for details.
October 2008	MB	Chapter 5: Revised ordering information and X-options.

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Preface

This *Systems Assurance Guide* is intended for account executives, system engineers, professional services personnel, service engineers, marketing and sales representatives, plus anyone interested in information about the SL500 Modular Library System (also called the SL500 library or just library throughout this guide).

Read Me First

This guide is part of the SL500 Site Preparation Kit (TM0001), which contains checklists in electronic format that identify the customer configurations and environments.

These checklists are required as part of the systems assurance process and the exchange of information to make sure that no aspects of the sale, order, or installation processes are overlooked.

These checklists are also presented in this guide as a place for you to fill-in the blanks—feel free to use them.

Organization

The organization of this guide is:

Chapter 1	“Introduction” provides an overview about the SL500 Modular Library System.
Chapter 2	“System Assurance” describes the exchange of information among team members to make sure that nothing is overlooked.
Chapter 3	“Site Survey” provides space where you can record the different platforms, applications, and hardware configurations the customer <i>currently</i> has.
Chapter 4	“Site Preparation” contains a site planning checklist and information.
Chapter 5	“Ordering” describes the components and part numbers to help you order the library.
Appendix A	“Tape Drives and Cartridges” provides information about the tape drives used in this library.
Glossary	“Glossary” defines terms and abbreviations in this guide.

Related Publications

Refer to the following publications for additional information about the SL500 Modular Library System:

Publication	Part Number
<i>Base Module Card</i>	96121
<i>Cartridge Expansion Module Card</i>	96182
<i>Customer Orientation Checklist</i>	96200
<i>Diagnostics/Troubleshooting Guide (Proprietary)</i>	96153
<i>Drive Expansion Module Card</i>	96178
<i>F40 Cabinet Users Guide</i>	96100
<i>Installation Manual (Proprietary)</i>	96114
<i>Interface Reference Manual</i>	96140
<i>Local Operator Panel Guide</i>	96258
<i>Principles of Operation Manual (Proprietary)</i>	96156
<i>Replaceable Parts Catalog (Proprietary)</i>	96120
<i>Site Preparation Kit</i>	TM0001
<i>SL500 Simple Network Management Protocol Guide</i>	316194601
<i>User's Guide</i>	96116

Tape Drive Documentation

Hewlett Packard Ultrium tape drive information

International Business Machines (IBM) Ultrium tape drive information

Quantum tape drive information

Part Number

CD included with tape drive

CD included with tape drive

Available from Quantum

Library publications are available in portable document format (PDF) online at the Sun StorageTek documentation Web sites listed below. For more information see [“Training and Publications” on page 61](#) for a description of the *publications and training* available for the SL500 library.

Additional Information

Sun Microsystems, Inc. (Sun) offers several methods for you to obtain additional information.

Sun’s External Web Site

Sun’s external Web site provides marketing, product, event, corporate, and service information. The external Web site is accessible to anyone with a Web browser and an Internet connection.

The URL for the external Web site is: <http://www.sun.com>

The URL for StorageTek™ brand-specific information is:

<http://www.sun.com/storagetek/>

SunSolve and Helpful Links

SunSolve and the Sun links below are Web sites that enable members to search for technical documentation, downloads, patches, features and articles, plus the Sun Systems Handbook. These sites are currently undergoing transition and the need to migrate the internal SunSolve portal off the old infrastructure. Our apology for any inconvenience.

These links are available to help you locate information:

■ Documentation:

Customer: <http://docs.sun.com/app/docs>

Proprietary: <http://doc.sfbay.sun.com/app/docs>

■ Downloads:

Internal code: <http://dlrequest.sfbay.sun.com:88/usr/login>

Customer-accessible: <http://www.sun.com/download/index.jsp>

OEM/Partner: <http://spe.sun.com/spx/control/Login>

- **SunSolve:**
 - External site: <http://sunwebcms.central>
 - Internal site: <http://sunsolve.central.sun.com>
- **Applications** (Encryption Request Form, Getkey, one-time passwords):
<http://crcapplications/keyswebapp/> — Enter your e-mail address and LDAP
- **Drivers:** <http://www.sun.com/download/index.jsp>
- **CRC Migration:** <http://crc2sun.sfbay/>
- **Service Delivery Platform (SDP):**
 - Documents: <http://csa-wiki.central.sun.com/display/SDP/Internal+SDP+Documents>
 - Installation & Configuration Guide: <http://sunwebcollab.east.sun.com/gm/folder-1.11.1665053>
- **Sun Systems Handbook:**
 - Customer-accessible:
http://sunsolve.sun.com/handbook_pub/validateUser.do?target=index
 - Proprietary: http://sunsolve.sun.com/handbook_pub/validateUser.do?target=STK/STK_index—click login at the right for internal/external document lists
- **Storage Integrated License Key System (SILKS):**
<https://silks.central.sun.com/silks>
- **Tape Technical Support:** <http://suntape.central.sun.com/main.shtml>
- **Configuration Control Documents:** <http://sunwebcollab.east.sun.com/gm/folder-1.11.1684385>

Partners Site

The StorageTek Partners site is a Web site for partners with a StorageTek Partner Agreement. This site provides information about products, services, customer support, upcoming events, training programs, and sales tools to support StorageTek Partners. Access to this site, beyond the Partners Login page, is restricted. On the Partners Login page, employees and current partners who do not have access can request a login ID and password and prospective partners can apply to become StorageTek resellers.

The URL for partners with a Sun Partner Agreement is:

<http://www.sun.com/partners/>

Global Services Support Tools

Global Services Support Tools site (also called Field Tools) provides tools that aid in the sales and support of Sun StorageTek brand products and services. This is an internal Web site for employees.

The URL for the Global Services Support Tools is

http://sunsolve.central.sun.com/handbook_internal/FieldTools/

Introduction

Sun StorageTek's Modular Library Systems are a new automated tape library family that maintains StorageTek's dominance of automated tape libraries and forms the basis for a new generation of libraries that will transform how customers use and think of storage.

The product family uniquely addresses clear customer requirements for very high availability—defined as near-zero:

- Near-zero scheduled downtime through dynamic additions in capacity (slots) and throughput (tape drives)
- Near-zero unscheduled downtime through improved reliability, as well as redundant and hot-swappable components

When coupled with Sun's virtual products, the Sun StorageTek product family provides platforms that offer automated, guaranteed backups, automated drive and media migration, and other virtual tape services.

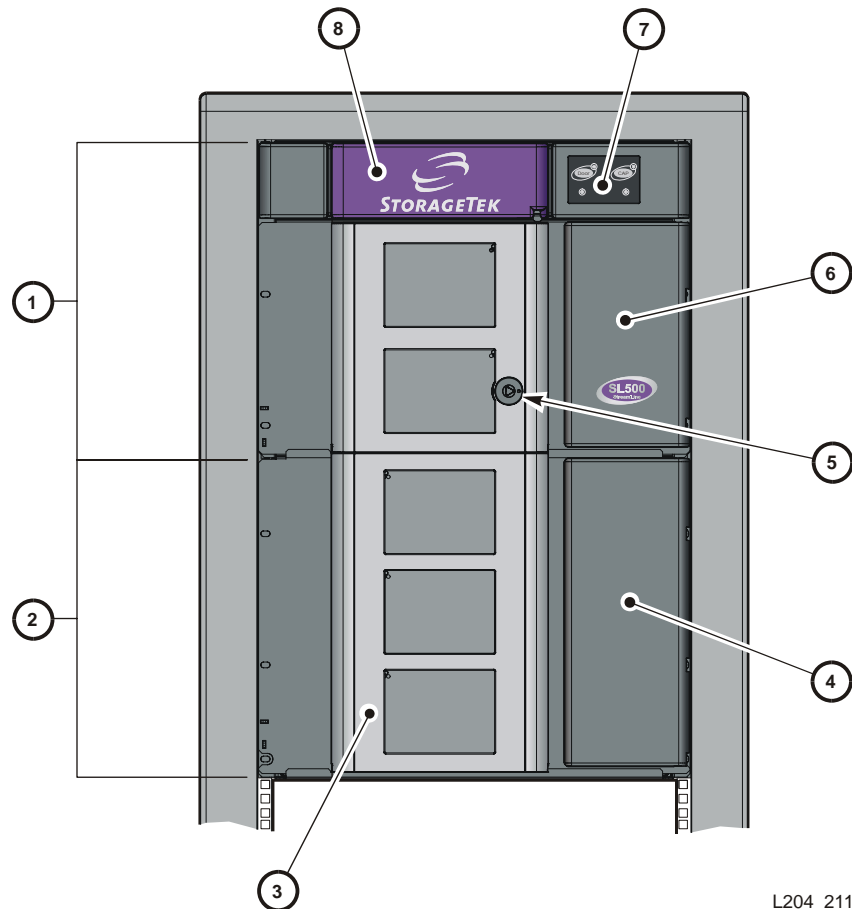
These libraries are simple to manage and easy to monitor with remote (standard) and local (*optional*) operator panels. The libraries are cost competitive with base configurations and the scalability to grow as needed by the customer. The libraries' high reliability also results in lower service costs, providing the customer with a lower total cost of ownership.

This chapter provides an overview of the SL500 Modular Library System, which is referred to as the SL500 library or just the "library" throughout this guide.

Library Overview

The SL500 library, shown in [FIGURE 1-1](#) and [FIGURE 1-2](#), is a self-contained, fully automated, cartridge tape storage system that is scalable and mounts into a standard 483 mm (19 in.) rack or cabinet. The base module is also available as a desktop version.

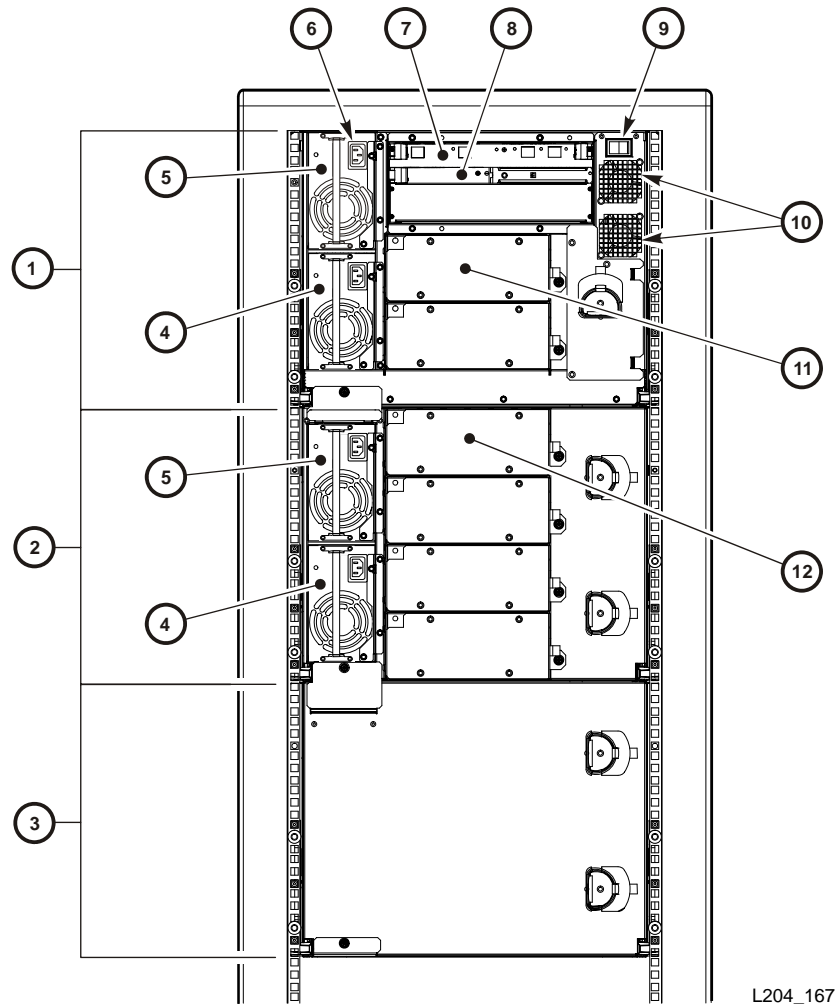
FIGURE 1-1 Front View of Components



L204_211

-
- | | |
|---|--|
| 1. Base module | 5. Library door lock |
| 2. Expansion module | 6. Base unit cartridge access port (CAP) |
| 3. Library door | 7. Keypad |
| 4. Expansion module cartridge access port | 8. Robotics unit (with removable facade) |
-

FIGURE 1-2 Back View of Library Components



L204_167

- | | |
|---------------------------------|---|
| 1. Base module | 7. RLC controller card |
| 2. Drive expansion module | 8. MPU2 (Fibre Channel) or MPW/RLW (SCSI) |
| 3. Cartridge expansion module | 9. Library main power switch |
| 4. Redundant power supply | 10. Library fans |
| 5. Standard power supply | 11. Tape drive 1 in base unit |
| 6. Power supply cord receptacle | 12. Tape drive 1 in expansion module |

Capacity on Demand

The SL500 library includes the Capacity on Demand feature. Capacity on Demand separates physical capacity from licensed capacity, and allows you to pay only for the capacity you need. Then as your needs grow, you can add modules and license the portion that you need. To expand capacity within a module, you need only purchase and install a license key file for the new capacity, and then reboot the library.

Note – Starting with SL500 firmware version 1300 and SLConsole version FRS_4.00, storage capacity upgrades must be installed through the SL500 licensing utility. This feature controls cartridge storage cells only. All installed tape drives are available by default. All cells in CAPs configured for enter and eject operations are available if the module containing the CAP has any licensed storage cells.

Capacity on Demand Features and Restrictions

Important features and restrictions of Capacity on Demand that will help your customer to plan for and use the feature in your SL500 library are:

- Only licensed storage cells can be used for tape cartridge storage. Unlicensed storage cells cannot be used for cartridge storage, nor can they be accessed by any hosts.
- The minimum licensed capacity is 30 storage cells for LTO-only libraries, and 24 storage cells for mixed-media libraries. This is identified as a LimitedBase license.
- Customers can purchase additional licensed capacity in the following increments:
 - FullBase—Licenses all storage cells in the Base Module
 - FullDEM—Licenses all storage cells in a drive expansion module (DEM).
 - ThirdDEM—Licenses one-third of the storage cells in a DEM. To license two-thirds of a DEM, you would install two ThirdDEM licenses. To license all of a DEM, you could install three ThirdDEM licenses or one FullDEM license.
 - FullCEM—Licenses all storage cells in a cartridge expansion module (CEM).
- After installing additional licensed capacity, you must reboot the library. Once verified by the library controller, the additional storage cells are available for use.
- Storage capacity is incremental. Total licensed capacity is equal to the sum of the capacities specified in each license key file installed and activated on the library.
- The order that capacity licenses are installed is not significant (that is, it does not need to match the order of the modules in the SL500 frame).
- The SL500 does not support gaps in licensed capacity; *all storage cells must be contiguous*. This has the following effects on capacity planning:
 - You can begin adding licensed capacity to a module *only* if the module directly above it is licensed at full capacity.
 - Deleting a Capacity license for a module in the middle of a library will cause the modules below it to be unavailable. Any partitioning definitions affect will need to be re-done to account for the deleted slots.

Note – CEMs must be at the bottom of any SL500 configuration.

Terminology

The following terms are used to describe library capacity management:

- Physical or installed capacity—The number of storage cells physically present in the library.
- Licensed capacity—The number of storage cells the library is licensed to use. This cannot exceed the installed capacity.

Licensing

The license utility allows the customer (or a service representative) to install optional features on the library. This utility begins with SL500 firmware version 1300 and StorageTek Library Console version FRS_4.00.

Examples of installing and displaying licenses for the library are supplied in this section (see “[Installing a License](#)” on page 26). You can refer to these procedures if you are asked to install the licenses. Directions for customers to install the licenses are supplied in the *SL500 User's Guide*, part 96116. The URL for the Storage Integrated License Key System (SILKS) is <https://silks.central.sun.com/silks>

For SL500 hardware upgrade issues, customers should contact Sun Technical Support and create a service request.

For SILKS licensing issues the Storage TSC Tape Support Team (Backline/Tier 3) should email the SILKS_Help_Team@sun.com.

For SILKS IT application issues, users should create a ServiceDesk ticket:

Report a Problem > Software Applications > SILKS INFRA

- AMER: <http://servicedesk.central>
- APAC: <http://servicedesk.singapore>
- EMEA: <http://servicedesk.uk>

Two examples of major licenses include Partitioning and Capacity on Demand.

License Key File

A license key file is delivered to the customer in an e-mail correspondence. Once received, the customer (or service representative) can perform this task

The license key file is installed through a session in StorageTek Library Console.

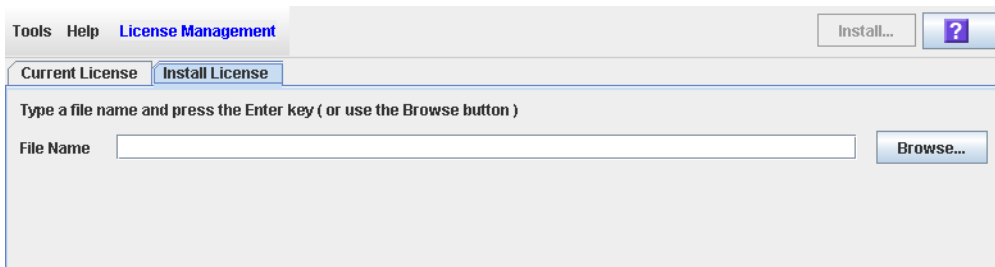
The license key file is a digitally signed image (.img) file containing one or more license keys for the features customers have purchased. In order to ensure that features are installed on the correct library, the license key file includes the serial number of the target library and can only be installed on that library.

Each license key file is assigned a unique sequence number. The sequence number ensures that only one instance of a license key file can be installed on a library at a time. SL500 licenses are cumulative. When you install a new license key file, the included features are added to the features already installed on the library. SL500 licenses do not expire.

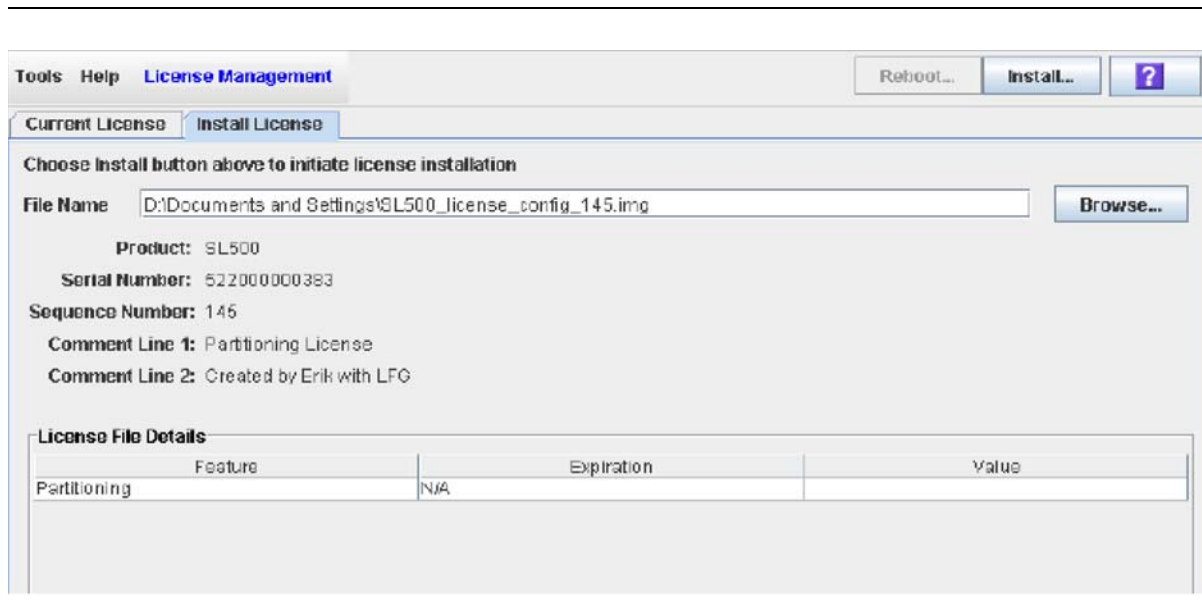
Installing a License

To install a new license key file, you must:

1. Obtain the e-mail attachment that is sent to the customer.
2. Download the attachment to a laptop or other system accessible to StorageTek Library Console.
3. Using StorageTek Library Console, log into the library.
4. Select Tools > License Management, then click the Install License tab. The Install License screen appears.



5. In the File Name field, enter the full path to the license key file (or press Browse to navigate to the file's location).
6. Press Enter. The license file details are displayed



7. Review the key file details, then click Install.
8. The License Installation Confirmation popup screen appears. Click Yes.
9. You must reboot the library to activate the new feature.
10. To display current features (and verify what you just activated), Select Tools > License Management, then click the Current License tab.

The Current License screen appears.

The screenshot shows the 'License Management' window with the 'Current License' tab selected. It displays two tables: 'Current License Summary' and 'Associated Module Capacity License Detail'.

Current License Summary

Feature	Sequence Number	Value	Assigned
Capacity	99001	FullBase	Yes
Capacity	99002	ThirdDEM	Yes
Capacity	99003	ThirdDEM	Yes
Partitioning	145	None	No

Associated Module Capacity License Detail

Module Number	Capacity	Sequence Number
1	Full Capacity	99001
2	2/3 DEM Capacity	99002, 99003
3	None	000
4	None	000
5	None	000

118 Cells Licensed
25 Cells Unlicensed
143 Cells Total are Possible

SL500 Comm Status UserID: advsrv Library: green11.storitek.com

Library with LTO-only Cartridge Slots



Caution – Firmware problems: You can *not* mix LTO and mixed-media arrays and magazines within the same library. If you add expansion modules, the new modules must have the same type arrays as the existing modules.

The base module can be installed in a rack or placed on a desk, table, or similar sturdy surface. X-option number XSL500-DESKTP-KTZ contains covers, hardware, and other items to convert the base module into a desk-top version.

For each library:

- The base module contains the robotics unit and the base unit:
 - The robotics unit has the robotic components and the keypad
 - The base unit has up to 50 cartridge slots (see note), one or two tape drives, and a 5-slot cartridge access port (CAP).

Note – If the reserved slots are configured as storage slots, the numbering starts there. The CAP slots also can be configured as storage slots.

- Drive expansion modules and cartridge expansion modules can be added to a standard rack to accommodate various slot and tape drive configurations. *You must have a FullBase capacity base unit, either from the initial order or with the upgrade conversion bill, before you can order an expansion module.* Refer to [Chapter 5, “Ordering”](#) for part numbers.

LTO-only Slot Physical Configurations

Note – Your software might conflict with the following information. Refer to your software publication for unique information.

The following figures and tables show cartridge slot and tape drive locations. [FIGURE 1-3](#) shows a library with only a base module.

[FIGURE 1-4](#) shows a library with a base module that has nine reserved slots, one drive expansion module, and one cartridge expansion module.

[FIGURE 1-5](#) shows a library with a base module that has two reserved slots, one drive expansion module, and one cartridge expansion module. The storage slot numbering begins with the first slot after the reserved slots in column 1. The figure shows two reserved slots, but there could be more. If the reserved slots are configured as storage slots, the top slot (row 1) would be 1.

[FIGURE 1-6](#) shows the slot capacity of a cartridge expansion module according to which type of module is installed above and below it.

The numbering scheme uses the library, module, row and column scheme. Four integers are used to represent the cartridge and tape drive slots, *as viewed from the front of the library*.

1. Library number (always 0)
2. Library module number 1 (top of rack) through 5 (bottom of rack)
3. Row number 1 through 9 (base module) or 1 through 12 (expansion module)
4. Column number 1 through 9 for base module and drive expansion module, 1 through 11 for cartridge expansion module

FIGURE 1-3 Base Module, LTO-only Library Slots

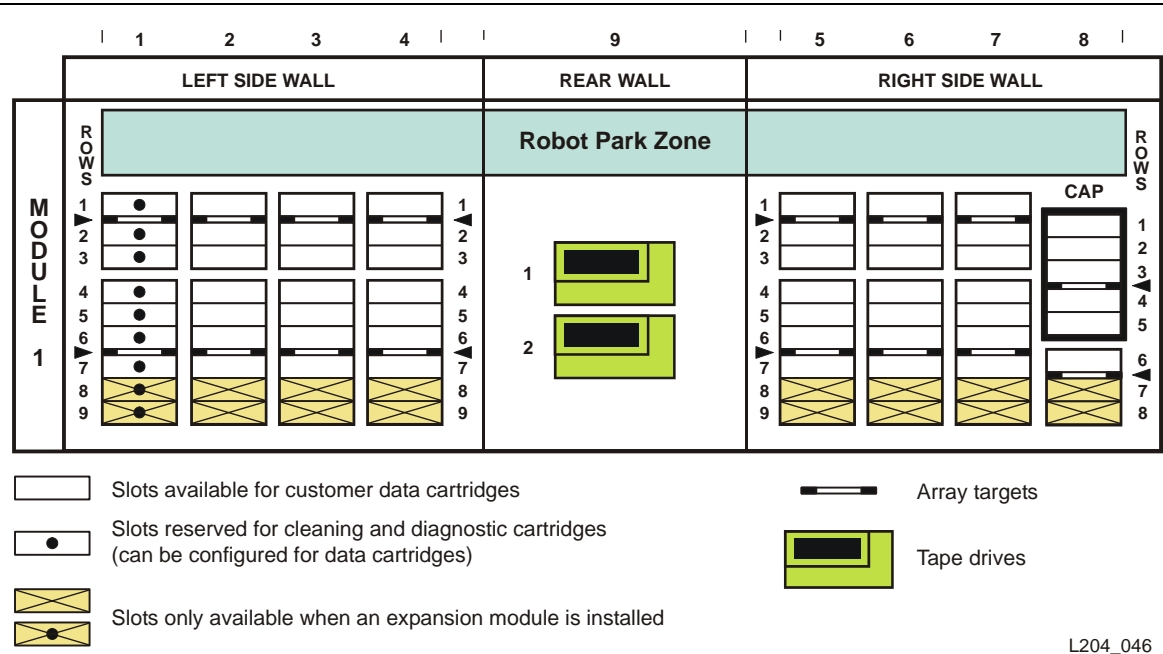
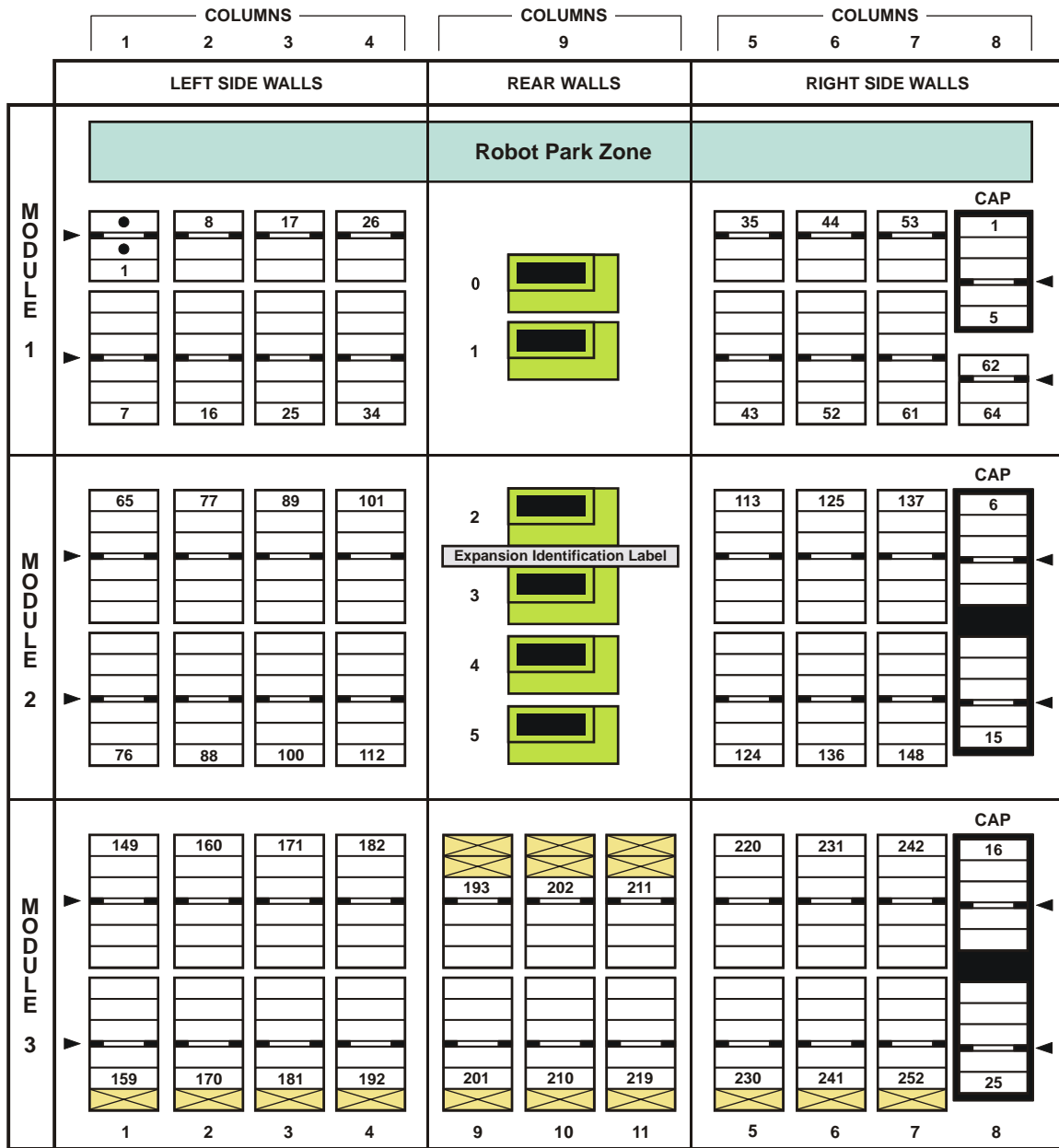


FIGURE 1-4 Firmware, LTO-only Library Slot Mapping



L204_047

FIGURE 1-5 SCSI Element Numbering Mapping—LTO-only Library



Slot available for customer data cartridges

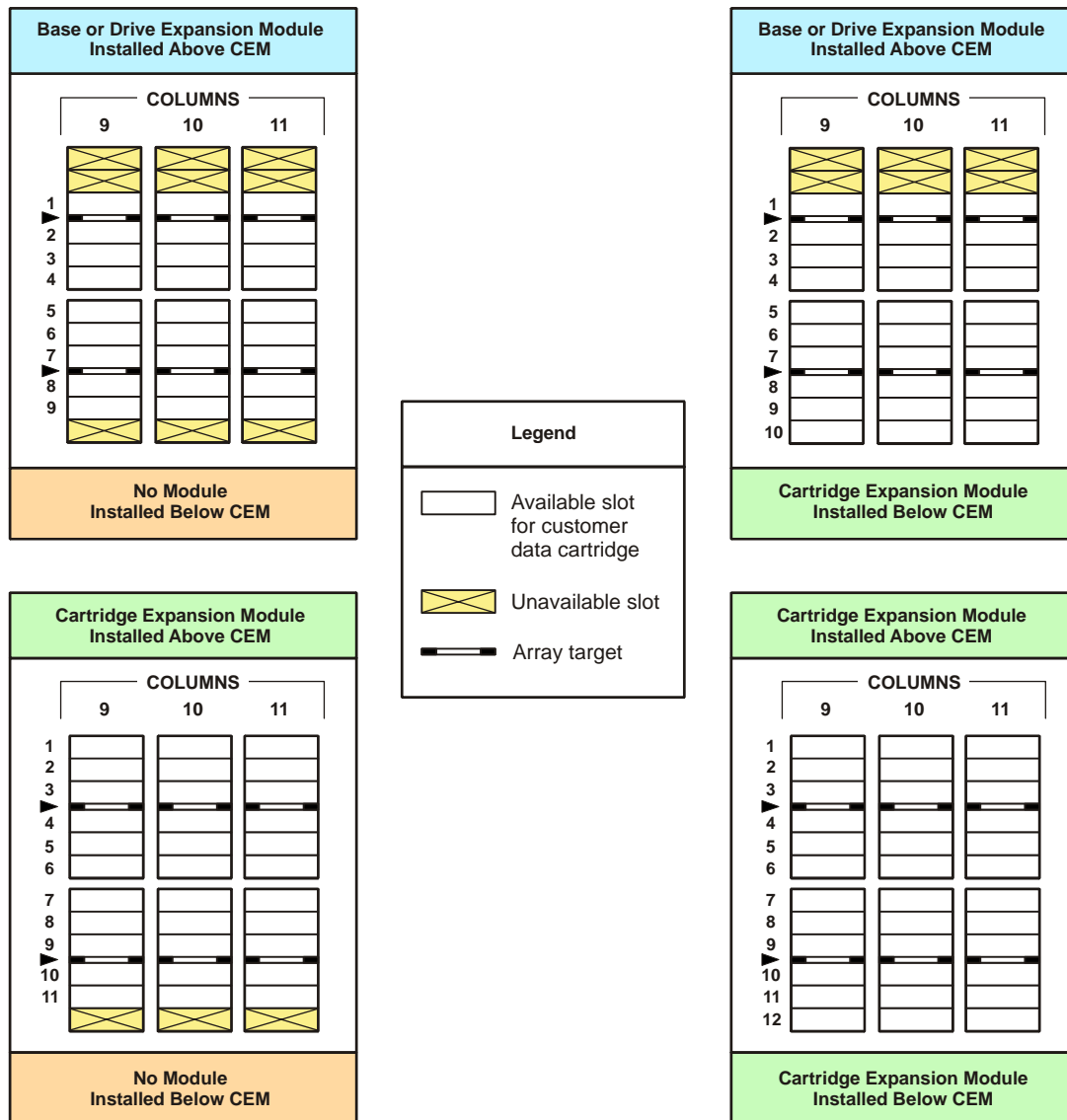
Slot reserved for cleaning and diagnostic cartridges (can be configured for data cartridges)

Unavailable slot

Array target

Tape drive

L204_049

FIGURE 1-6 LTO-only Library Slots for Back Wall of Cartridge Expansion Module

L204_263

LTO-only Capacity Calculations

TABLE 1-1 and TABLE 1-2 on page 34 relate to LTO-only libraries. The table assumes that, when DEMs and CEMs are installed in the same library, the DEMs are above all of the CEMs, *as preferred*. **Do not install an EZ DEM below an original CEM. This is not physically allowed.**

Adding LTO slot capacity is covered in [Chapter 5, “Ordering”](#).

TABLE 1-1 LTO-only Licensed Capacity Rules

Description	Physical Capacity	...with License Value
Base Module only (shipped standard)	30	LimitedBase
as last module	50	FullBase
with any module below	66	FullBase
Adding a DEM as the last module	77	ThirdDEM (in increments of 26, 26, 25)
with any module below	84	ThirdDEM (in increments of 28, 28, 28)
Adding a CEM after a DEM or Base Module	104	FullCEM
with any module below	114	FullCEM
CEM after CEM	110	FullCEM
with any module below	120	FullCEM

TABLE 1-2 LTO-only Licensed Capacity Example

Module	Licensed Capacity Value Installed	License Sequence Number	Additional Raw Capacity Available	Additional Licensed Slots*	Library Total Count
Base Module					
Shipped standard	LimitedBase			30	30
Full capacity	FullBase	100		+20	50
Drive Expansion Module			16	+16	66
	1/3 DEM (increments of 26, 26, 25)	101	77	+26	92
	1/3 DEM (increments of 26, 26, 25)	102		+26	118
	1/3 DEM (increments of 28, 28, 28)	103		+25	143
Cartridge Expansion Module			7	+7	150
	FullCEM	104	104	114	254

Mixed Media Slot Physical Configurations

The following figures illustrate the physical configurations for mixed media libraries.

FIGURE 1-7 Base Module, Mixed-Media Library Slots

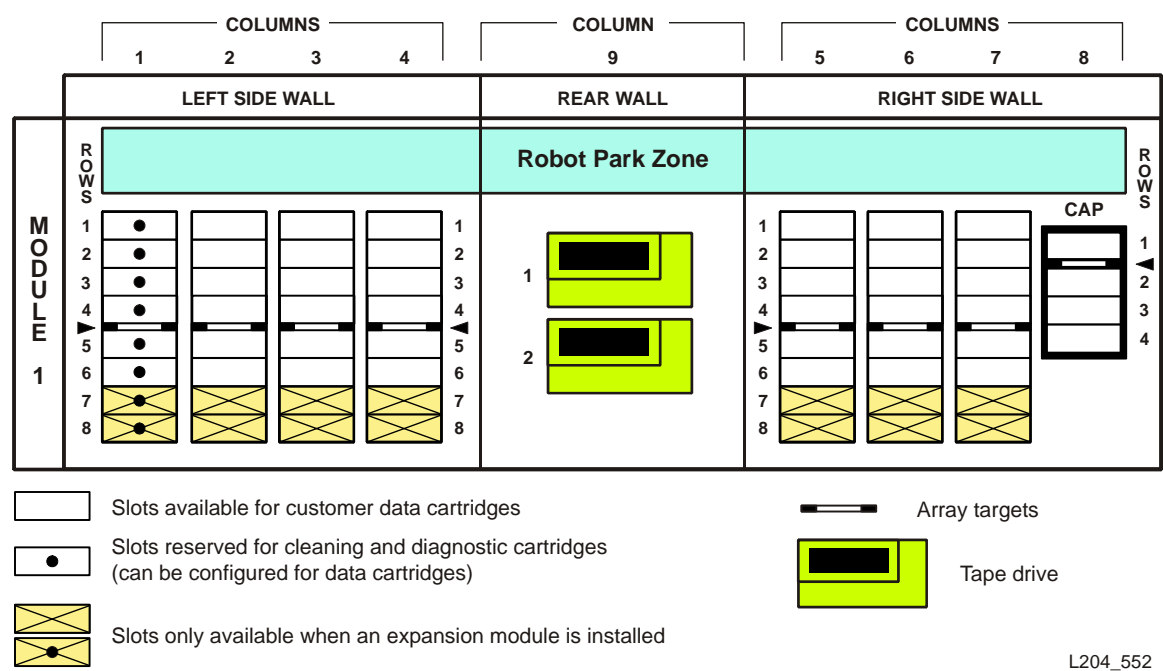


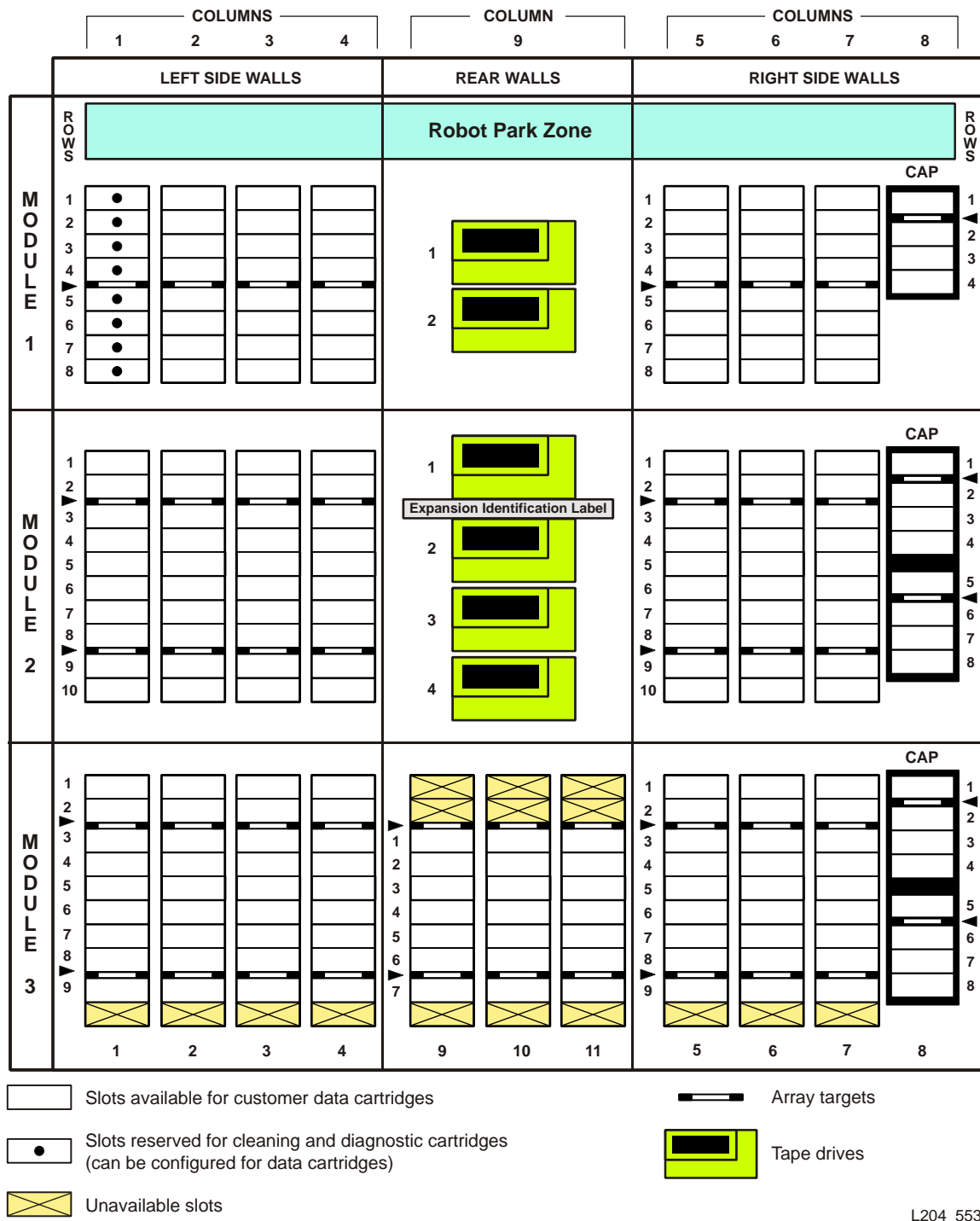
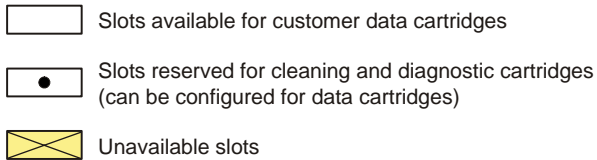
FIGURE 1-8 Firmware, Mixed-Media Library Slot Mapping

FIGURE 1-9 SCSI Mixed-Media Library Element Numbering Mapping

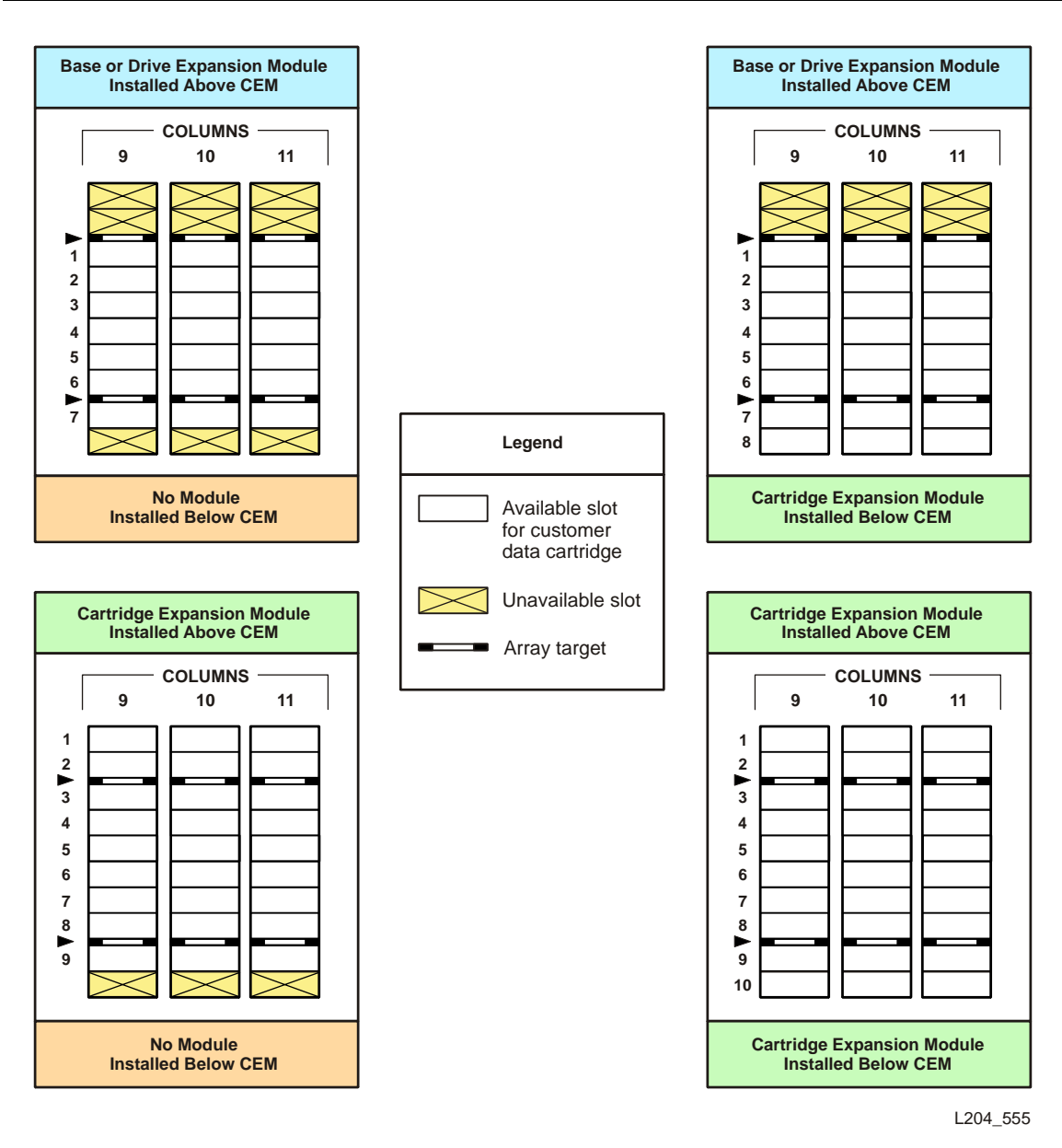


Array targets

Tape drives

L204_554

FIGURE 1-10 Mixed-Media Library Slots for Back Wall of Cartridge Expansion Module



Mixed Media Capacities

All capacity counts assume zero reserved slots and all CAPs are configured as I/O slots. The restricted slot count reduces the available slot capacity one-for-one. Configuring any CAP slots as storage slots within a licensed module increases the available slots for 1/3 calculations. CAP slots outside any unlicensed module—regardless if configured as I/O or storage—are not available for use.



Caution – Firmware problems: You can not mix LTO and mixed-media arrays and magazines within the same library. If you add expansion modules, the new modules must have the same type arrays as the existing modules.

Your robotics unit must be part number 314558705 or higher to read SDLT cartridge labels.

Mixed Media Library Licensed Capacity Rules

TABLE 1-3 and TABLE 1-4 on page 40 relate to mixed media libraries. The table assumes that, when DEMs and CEMs are installed in the same library, the DEMs are above all of the CEMs, *as preferred*. **Do not install an EZ DEM below an original CEM. This is not physically allowed.**

Adding mixed media slot capacity is covered in Chapter 5, “Ordering”.

TABLE 1-3 Mixed Media Library Licensed Capacity Rules

Description	Physical Capacity	...with License Value
Base Module only (shipped standard)	24	LimitedBase
as the last module	42	FullBase
with any module below	56	FullBase
Adding a DEM as the last module	63	ThirdDEM (in increments of 21, 21, 21)
with any module below	70	ThirdDEM (in increments of 24, 23, 23)
Adding a CEM after a DEM or Base Module	84	FullCEM
with any module below	94	FullCEM
CEM after CEM	90	FullCEM
with any module below	100	FullCEM

TABLE 1-4 Mixed Media Library Licensed Capacity Example

Module	License Value	License Sequence Number	Additional Raw Capacity Available	Additional Licensed Slots*	Library Total Count
Base Module	Shipped standard		24	24	24
	FullBase	100		+18	42
Drive Expansion Module 1st one under a base module	(none)		14	+14	56
	ThirdDEM (increments of 21, 21, 21)	101	63	+21	77
	ThirdDEM (increments of 21, 21, 21)	102		+21	98
	ThirdDEM (increments of 21, 21, 21)	103		+21	119
Drive Expansion Module 2nd one under another module	(none)		7	+7	126
	ThirdDEM (increments of 21, 21, 21)	104	63	+21	147
	ThirdDEM (increments of 21, 21, 21)	105		+21	168
	ThirdDEM (increments of 21, 21, 21)	106		70	189
Drive Expansion Module 3rd one under another module	(none)		7	+7	196
	ThirdDEM (increments of 21, 21, 21)	107	63	+21	217
	ThirdDEM (increments of 21, 21, 21)	108		+21	238
	ThirdDEM (increments of 21, 21, 21)	109		+21	259
Cartridge Expansion Module					
	(none)	7	+7	+7	256
	FullCEM	110	84	+84	350

Host Notification for Capacity Changes

When storage capacity is changed, the library controller notifies all affected hosts according to their interface requirements. SCSI hosts are notified by a “Mode Parameters Changed” unit attention. The host must re-audit the library to discover the configuration changes. Customers must consult the appropriate tape management software documentation for detailed procedures and commands.

Partitioning Feature—Overview

The SL500 library can now be partitioned into various sections. Briefly stated, this means that instead of one library (with all its cartridge slots, tape drives and CAPs) being a single entity, the library and these components can now be divided into multiple sections (up to eight). Each partition can be accessed by one host or multiple hosts.

If your customer orders the partitioning feature, the service representative must enable the feature and work with the systems administrators who will be involved with assigning the partitions.

Partitioning is an option. Licensing is required to enable the feature. See [“Licensing” on page 25](#) and [“Partitioning License” on page 93](#).

Clear communication and cooperation among system programmers, network administrators and Sun service representatives are essential. Be sure to share this information with all those involved in the partitioning effort and, if need be, correspond with other members of the Sun service community when assistance is required.

Note – *It is best that all questions are answered before attempting to partition a library.*

Partitioning—General

Partitioning has terms associated with it that you and your customer must understand to effectively use the feature. In certain cases, these terms redefine some concepts that are familiar with users of the traditional, non-partitioned library configuration.

A “partition” is defined as the process of dividing portions of a library into discrete sections. The partitioning feature offers great flexibility for users. A partition can be as small as a single storage slot, a single CAP slot, or one tape drive if desired. A library can also contain multiple partitions. Customers could also set up a single and/or multiple partitions that are accessible by single or multiple hosts.

The key to understanding partitioning is knowing what partitions exist, their boundaries, and who has access to the specific partitions that are configured.

Setting up a partition requires some important considerations:

- If one partition designates several tape drives *solely* to its partition, no other partitions can use these tape drives.
- Partition users must also anticipate how much storage area is needed for their resident tape volumes and the amount of free slots required.
- CAP assignments are also critical. CAP slots can be specifically assigned to certain partitions or left open for common use. This will be discussed in detail later.

Storage slots and drives that are *not* assigned a partition within a partitioned library cannot be accessed. A customer could leave an area of slots unassigned, for example, in preparation for a planned future partition.

The SCSI element numbering within partitioned libraries is continuous for each partition, even if slot locations for each partition are non-contiguous. Using [FIGURE 1-11](#) as an example, if one partition owns the base and cartridge expansion modules, SCSI element numbering begins at the first available slot in the base module and continues through the cartridge expansion module slots. For the partition owning the driving expansion module, the first slot in that module will begin the element numbering for that partition and continue throughout the module.

FIGURE 1-11 Partitioning a Library



L204_553

Partitioning—Access Control

Host definitions are assigned to specific partitions. Customers can assign multiple host definitions to a single partition. However, they cannot assign the same host definitions to multiple partitions. For example, Partition 1 could be set up for hosts 2, 3, and 4; Partition 2 could have hosts 1 and 5 for host definitions. They could not, however, assign host 1 or 5 to *both* Partitions 1 and 2.

The host definition consists of:

- Host ID (WWN)
- Port number
- Logical unit number (LUN)

Partitioning—Location Numbering

Location numbering is composed of four digits: Library number, Module number, Row number, and Column number.

In a non-partitioned library configuration, the location number for the library always begins with the number “0.” For partitioned libraries, however, the library number will change to the partition number.

If Partition 1 was composed of the entire base module, locating a cartridge in module 1, row 8, column 1 in the base module would translate into the following: 1, 1, 8, 1.

If Partition 2 was composed of the entire drive expansion module, row 10, column 1 would translate into 2, 2, 10, 1.

Partitioning—CAP Behavior

Whereas cartridge slots and drives can be partitioned, CAPs (or CAP slots) can be configured for:

- Assignment to a specific partition only (split assigned CAP)
- Common use for those partitions that do not specifically assign slots (common CAP)
- A combination of specific slots and common slots (mixed CAP)

Customers could conceivably partition two slots in an 8-slot CAP to a single partition and the remaining slots to a second partition, for example.

For partitioned libraries, these three configuration options for CAP assignments are explained below.

Split Assigned CAPs

As cartridge slots and tape drives can be partitioned, CAPs or CAP slots can be assigned to the sole use of a partition. When specific CAP slots are assigned to a *specific partition*, the split assigned CAP option is enabled

Careful planning in regard to anticipated CAP usage is required when using this option. *Only those CAP slots designated as split assigned can be used by the partition assigning them.*

Split Assigned CAPs—Example

The library (see [FIGURE 1-1 on page 22](#)) is composed of a base, drive and cartridge expansion modules. All cartridge slots, drives and CAP slots in the base module comprise Partition 1. All cartridge slots, drives and CAP slots in the drive expansion and cartridge expansion modules are assigned to Partition 2. Each partition has access to *only* the components configured for it.

If Partition 1 requests a CAP *import* operation, the procedure is:

- The operator selects Partition 1’s CAP through either the local operator panel or StorageTek Library Console.
- The CAP button on the base module is pressed.
- The top CAP door is opened. All remaining CAP doors remain closed.

- The operator completes the operation.

If Partition 2 requests a CAP *import* operation, the procedure is:

- The operator selects Partition 2's CAP through either the local operator panel or StorageTek Library Console.
- The CAP button on the base module is pressed.
- The top CAP door remains closed. All remaining CAP doors open.
- The operator completes the operation.

Multiple split CAP assignments are available within a library. This is in contrast to common assigned CAPs (see below).

Note – As the default behavior, if *no* partition has selected a CAP through the operator panel or StorageTek Library Console, the library will behave as if all split configured CAPs have been assigned to the CAP button. When the button is pressed, all CAP doors that are designated as split assigned will open to expose *all* split configured CAP slots, provided that no common configured CAP slot containing a cartridge is exposed.

Common (Unassigned) CAPs

The common (or unassigned) CAP configuration is present when there are no specified CAP slots designated (split assigned) to a partition or partitions. Strictly speaking, one does not “configure” or “assign” a CAP as common—any CAP slots that are not split assigned are available for mutual use among the remaining, unassigned partitions. Keep in mind that common CAPs are a single unit, shared among those partitions that have no split assigned CAPs.

Common (Unassigned) CAPs—Example

Referring to [FIGURE 1-11 on page 42](#), Partition 1 is set up to contain all cartridge slots and drives in the base module for a single host. The remaining cartridge slots and drives are a second partition used only by a second host. However, no CAP slots are explicitly assigned for a partition—both partitions can use all CAP slots.

An example of an *import* operation sequence for a common CAP would be:

- The operator selects the CAP through either the local operator panel or StorageTek Library Console.
- An operator presses the CAP button.
- All CAP doors open.
- A cartridge is placed in any CAP slot.
- The CAP door is closed.
- The cartridge is placed into a slot within the requesting host's partition.

In a second instance, assume that Partition 2 requests a CAP *export* operation of a cartridge. Since it is a common CAP, the operation would be:

- The operator selects the CAP through either the local operator panel or StorageTek Library Console.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed in any CAP slot.

- All CAP doors open.
- The operator completes the operation.

For common CAPs, slots may be used by all partitions who do not specifically assign them. However, only one partition can select a CAP for operation at one time. The operation must be completed before the CAP is released to someone else through either the operator panel or StorageTek Library Console.

Mixed CAPs

A mixed CAP option is present when both split CAP and common CAP configurations are present within a library.

Mixed CAPs—Example

Referring again to [FIGURE 1-1 on page 22](#), Partition 1 contains only the cartridge in module 1, column 5, row 1, and drive number 1 and the single CAP slot 1 in the base module. The remaining storage slots and drives are divided among partitions 2, 3, and 4. The remaining CAP slots are left unassigned. These unassigned CAP slots are usable by partitions 2, 3, and 4, but CAP slot 1 in the base module can only be used by Partition 1.

If Partition 1 requests a CAP *export* operation, the procedure is:

- The operator selects its CAP through either the local operator panel or StorageTek Library Console.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed into the top CAP slot of module 1's CAP.
- The top CAP door is opened. All remaining CAP doors remain closed.
- The operator completes the operation.

If Partitions 2 through 4 request an *export* operation, the procedure is:

- The operator selects a CAP through either the local operator panel or StorageTek Library Console. For this example, assume that Partition 2 has selected the top CAP for placement of the cartridge.
- The VOLSER of the cartridge to be exported is entered.
- The cartridge is placed into any module 1 CAP slot *except* the top one.
- All CAP doors open.
- The operator closes all CAP doors.

Within mixed assigned CAP environments:

- For common CAPs, one or more partitions can share those CAP slots not designated as split assigned.
- For split assigned CAPs, *several* configurations are possible. For example, the 4-slot CAP in a base module could be split assigned to Partition 1; the top four slots in the drive expansion module's CAP could be split assigned to Partition 2; the bottom four slots in the drive expansion module's CAP could be split assigned to Partition 3, and so forth. To fulfill the mixed definition, however, there must also be common CAP slots available.

The CAP Button—Its Function in Partitioned Libraries

A significant difference between a non-partitioned library's CAPs and those of a partitioned library must be noted. For a non-partitioned library, pressing the CAP button opens all CAPs that are configured as CAPs. *In a partitioned library, each partition must first have its CAP selected, using the operator panel or StorageTek Library Console. This will dedicate the CAP button to the use of those partitions that selected a CAP or CAPs for operation.* After selection, pressing the CAP button will open *only* the CAP doors assigned to that partition.

If *not* selected by any partition, pressing the CAP button will open only those CAP slots that are split assigned (see the note [on page 44](#)).

An important thing to remember is that if multiple partitions are assigned to the same CAP slots (that is, common slots)—and that CAP is selected for use by one partition—the CAP import/export operation must be completed and the new partition assignment made, before another member of that partition can gain access for CAP operations.

Power System

The SL500 library comes with two power options: standard and redundant.

- The standard option has one 110–240 VAC, single phase, 50–60 Hz power supply that provides DC power to the library.
- The redundant option provides an additional power supply as an *optional feature*. To provide redundancy, each supply should be plugged into a separate branch circuit.

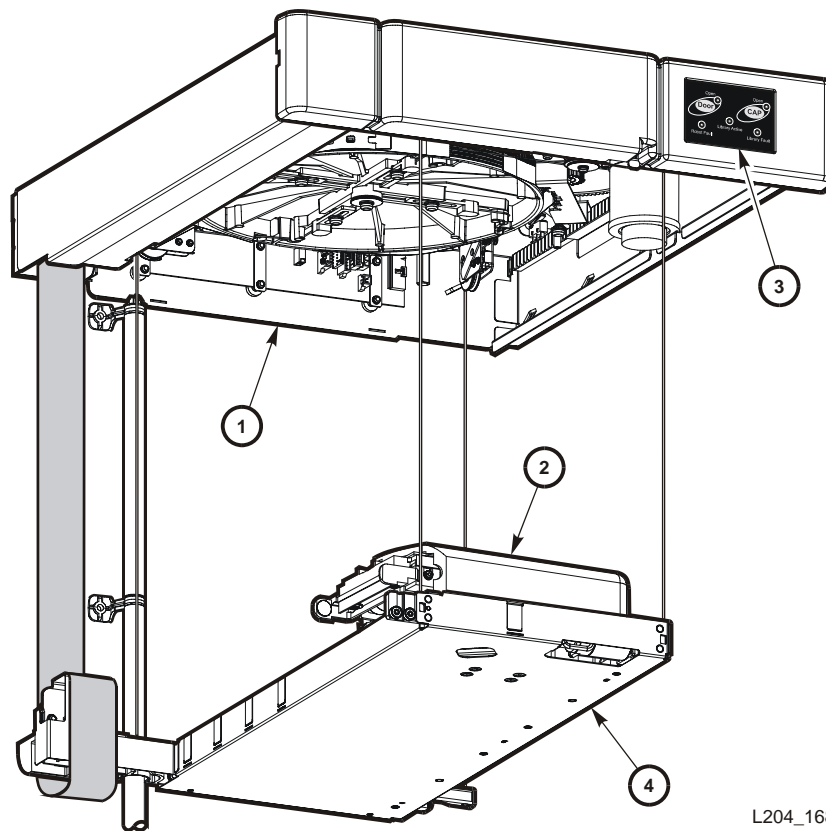
If something within the power supply or power source fails, the second supply provides power to the entire library until the failed power supply can be replaced or the power source is re-established.

See [TABLE 1-7](#), [TABLE 1-8](#), and [TABLE 1-9](#) for the power specifications.

Robotics Unit

The robotics unit ([FIGURE 1-12](#)) moves cartridges among the storage cells, tape drives, and cartridge access ports (CAPs) and is included with the base module. The three main components of the robotic unit are the:

- **Z drive assembly**—Uses a pulley system to vertically move the X table up and down
- **X table assembly**—Moves the hand horizontally across the library
- **Hand assembly**—Contains the wrist motor, gripper assembly, and bar-code scanner:
 - The wrist motor rotates the hand left and right.
 - The gripper assembly has fingers that grasp the sides of the cartridge.
 - The bar-code scanner targets and reads the volume serial numbers

FIGURE 1-12 Robotics Unit

L204_168

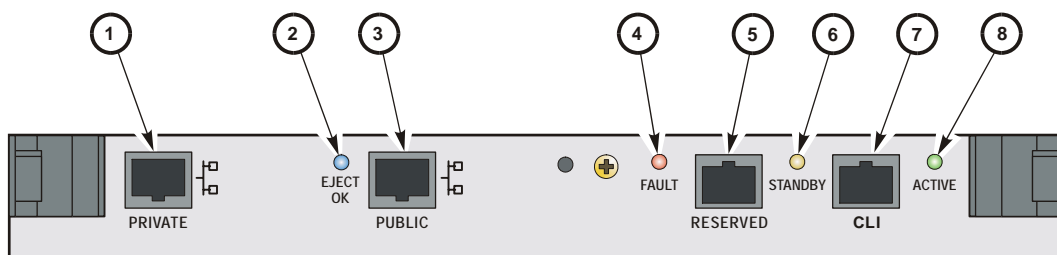
- | | |
|---------------------|--|
| 1. Z drive assembly | 3. Keypad (included because of its location) |
| 2. Hand assembly | 4. X table assembly |

Electronics

The electronics for the library consists of two types of cards:

- **RLC (control) card**—Contains the processor and controls the various functions of the library, such as the robotics, sensors, vision system, and the CAP. The RLC card also stores the library configuration and volume serial numbers of the cartridge tapes and their locations.
- **Interface card** — Provides the type of interface attachment to the library:
 - MPW/RLW card for a SCSI LVD interface
 - MPU2 card for a Fibre Channel interface

FIGURE 1-13 RLC Card Connectors



L204_090

1. Private Ethernet port is for future use.
2. Not used
3. Public Ethernet port is for remote service access, SLConsole, and SNMP.
4. Fault LED indicates that the control card has detected an error.
5. Reserved for future use.
6. Not used
7. CLI port is an RJ-45 serial port for service representatives.
8. Active LED indicates the library controller is active.

Operator Panels

There are three ways an operator can use to access the library:

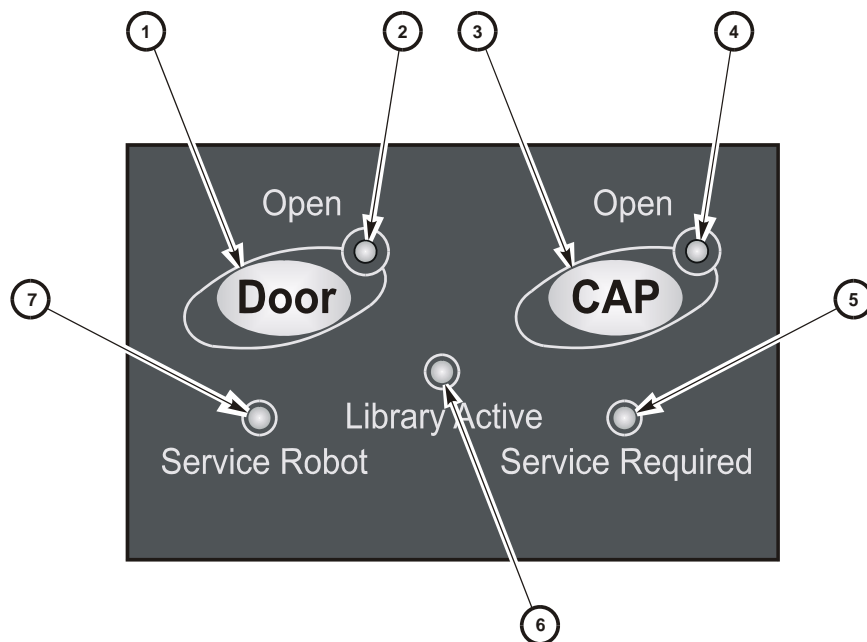
- Keypad (standard)
- Remote operator panel using StorageTek Library Console (standard)
- Local operator panel, touch screen (*optional feature*)

Keypad

FIGURE 1-14 shows the keypad, which has two buttons and five LEDs.

- The two buttons:
 - Door: calls the robot to move to the parked zone
 - CAP: opens the cartridge access port
- The five LEDs indicate library activity, service and fault status, CAP and front door status

FIGURE 1-14 Keypad



L204_229

- | | |
|------------------------|-------------------------------|
| 1. Open Door button | 5. Service Required indicator |
| 2. Open Door indicator | 6. Library Active indicator |
| 3. Open CAP button | 7. Service Robot indicator |
| 4. Open CAP indicator | |

StorageTek Library Console

The SL500 uses the StorageTek Library Console, a Java¹ application that provides a graphical user interface (GUI) for the library.

This application is accessed from a remote PC (*standard feature*) that uses a TCP/IP connection to the library.

StorageTek Library Console can be used to help diagnose problems with the library and its attached devices (tape drives, CAPs, and robot). It allows you to:

- Monitor device activity
- Load firmware
- Print reports

Local Operator Panel

The local operator panel is an optional feature that can be used to:

- View library component details (status, properties, and statistics)
- Locate a cartridge
- Move a cartridge
- Empty the hand
- Clean a tape drive

Cartridge Access Port

The cartridge access ports (CAPs) are located to the right of the front door of the library.

The base module has one standard CAP:

- The library with LTO-only arrays has one 5-slot CAP.
- The library with mixed-media arrays has one 4-slot CAP.

Each expansion module has a CAP consisting of two magazines:

- The library with LTO-only arrays has two 5-slot magazines.
- The library with mixed-media arrays has two 4-slot magazines.

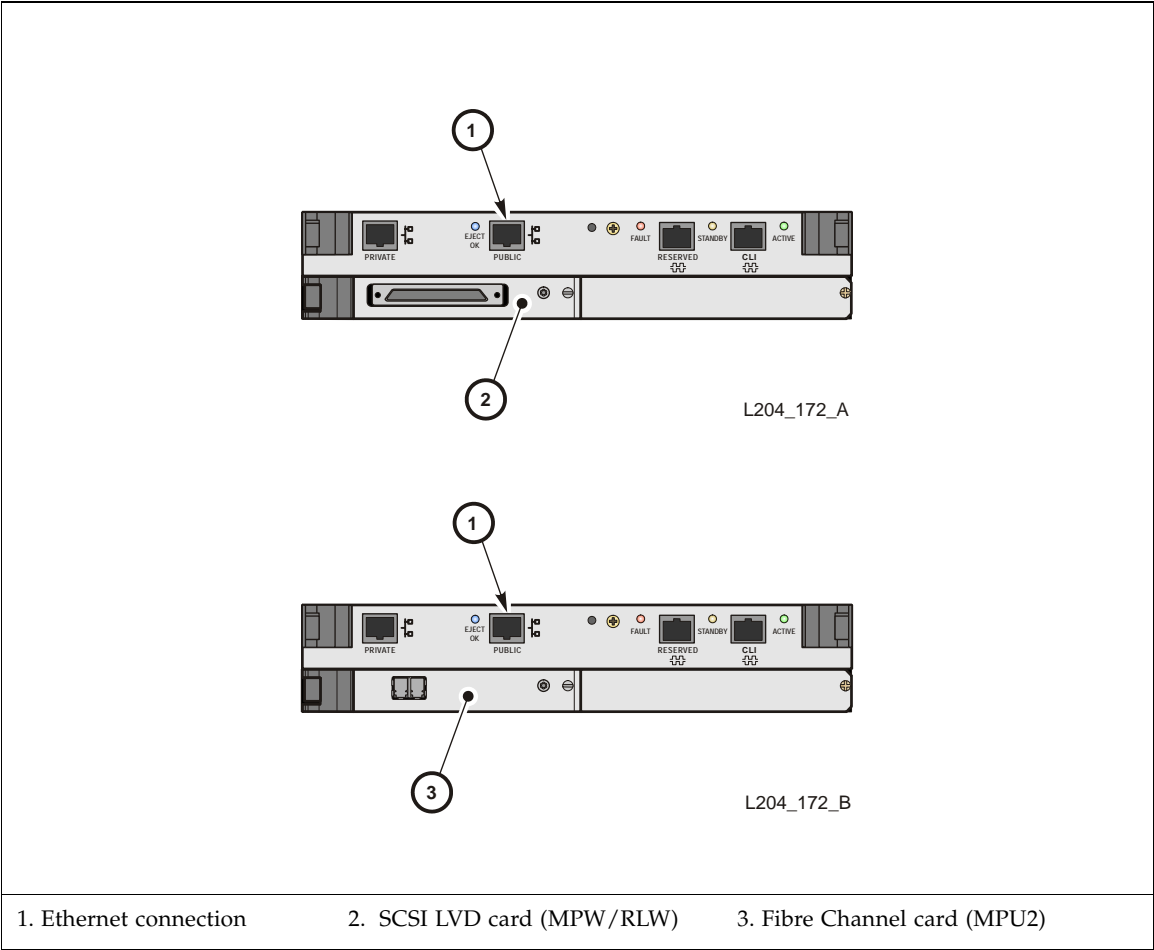
1. Java is a general purpose programming language with a number of features that make the language well suited for use on the internet and with Web browsers.

Library Interfaces

The SL500 library uses the following interface connections:

- Ethernet
- SCSI LVD
- Fibre Channel

FIGURE 1-15 Library Interfaces



Ethernet

The SL500 uses standard TCP/IP over Ethernet for the StorageTek Library Console and Simple Network Management Protocol connections.

Note – A private network connection to an Ethernet hub or switch is *recommended* for maximum throughput and minimum contention.

Simple Network Management Protocol

Simple network management protocol (SNMP) is an application-layer protocol that performs network management operations over an Ethernet connection.

SNMP allows systems administrators to query the library for configuration, operation, and statistical information *plus* SNMP allows the library to alert systems administrators of potential problems.

Systems administrators and network managers can use SNMP to monitor and receive status from the library, such as:

- Operational state of the library (firmware, serial number, online/offline)
- Library elements (columns, panels, slots, CAPs)
- Number of storage slots, media types, and tape drives

The SL500 library supports SNMPv3 and Management Information Base (MIB) II or higher.

MIB is a viewable document that contains descriptions about the characteristics for a managed device. These characteristics are the functional elements for that device which can be monitored using SNMP software.

For SNMP information, refer to the *SL500 Simple Network Management Protocol Guide*, part 316946601.

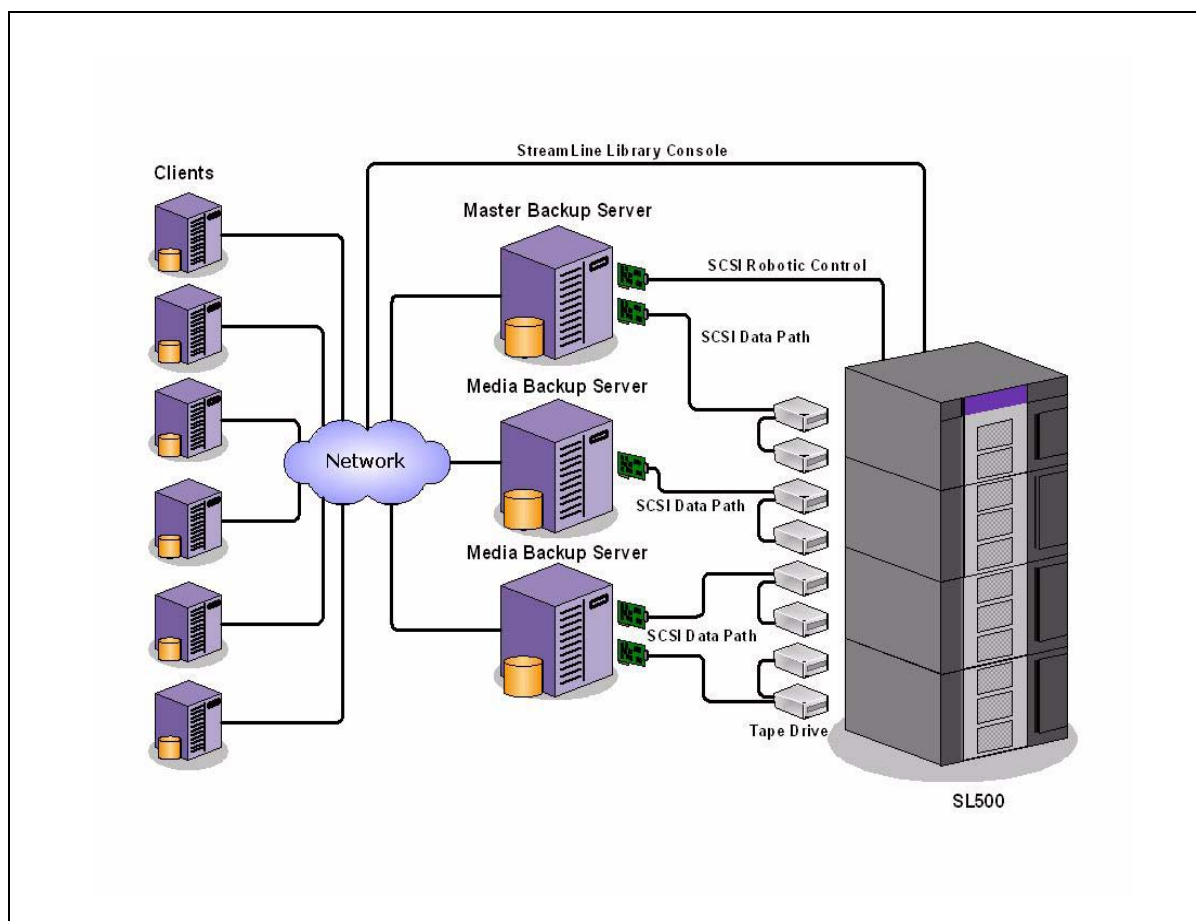
SCSI LVD

The small computer system interface (SCSI) is an ANSI standard, intelligent peripheral interface that has been in existence since the late 1970's.

The low voltage differential (LVD) implementation is the most recent development of this interface and provides a low noise, low power, low amplitude signal. This lower signal allows for faster switching and higher data transmission speeds. However, this lower signal also reduces the length of cable allowed for an LVD bus. An LVD bus can be up to 12 m (40 ft) long and can support up to 16 devices.

The SL500 library implements the SCSI-3 standard that uses a 16-bit bus, and supports data rates of up to 80 MB/s. SCSI 3 is also known as Ultra3 SCSI, Fast SCSI (Fast-80), or Ultra SCSI (Ultra160). 1

FIGURE 1-16 SCSI LVD Example



Fibre Channel

The SL500 Fibre Channel physical interface provides a native connection scheme that supports open system environments. Topologies include:

- **Switched Fabric**

Note: This topology is recommended for the library.

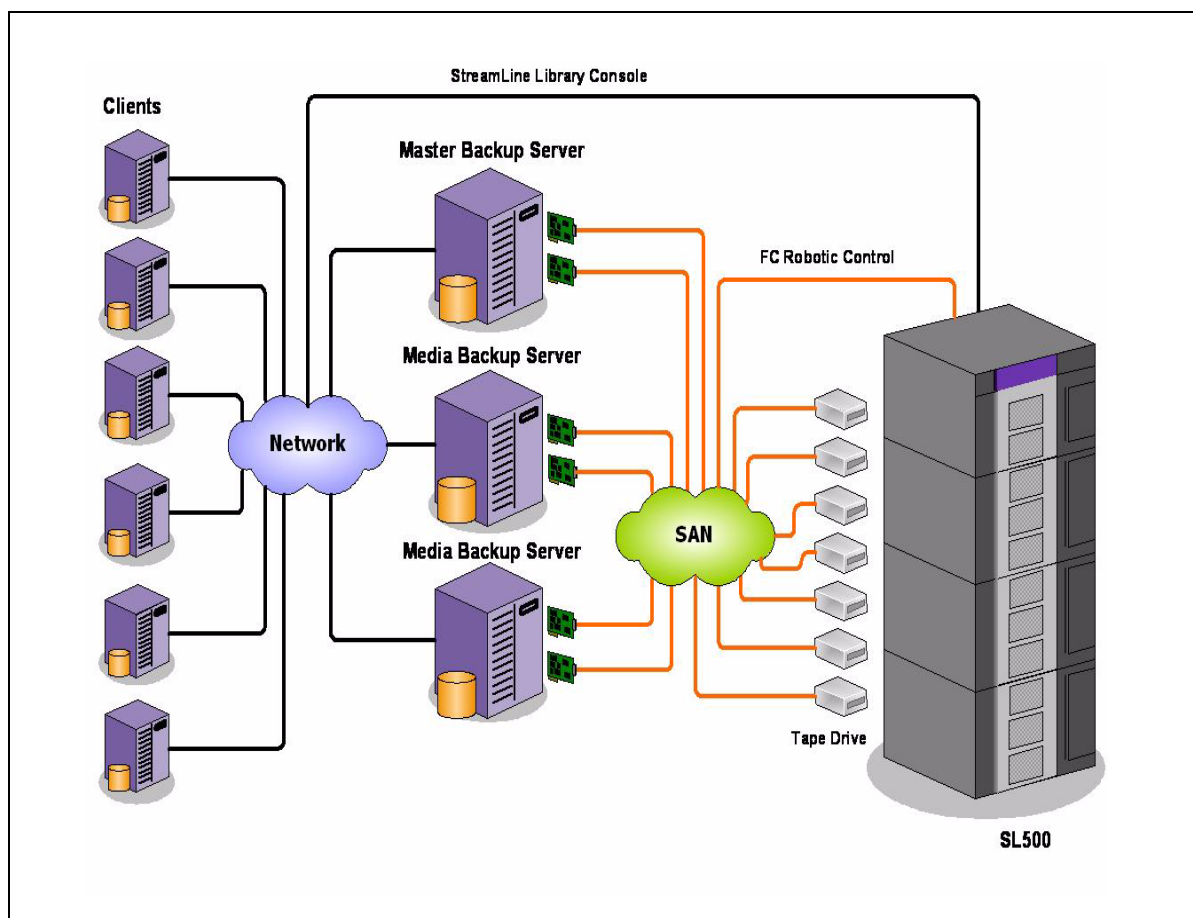
A switched fabric provides dynamic interconnections between nodes and multiple, simultaneous Fibre Channel connections for the network. If the library is connected to a Fibre Channel switch or fabric-capable host, the library configures itself as a switched fabric topology and can support up to 16 million ports logged into the fabric.

- **Arbitrated Loop**

Note: While the library supports the arbitrated loop topology, switched fabric is preferred for new or future implementations.

Arbitrated loops provide multiple connections for devices that share a single loop and allow only point-to-point connections between an initiator and target. An arbitrated loop can connect up to 126 ports.

FIGURE 1-17 Fibre Channel Example



Library Management Software

Library management software components control the library and manage the library database. They also retain volume location and attribute information, plus they perform activities such as mounts and dismounts, enters and ejects.

Sun offers several software components depending on the platform, connection type, and operating system.

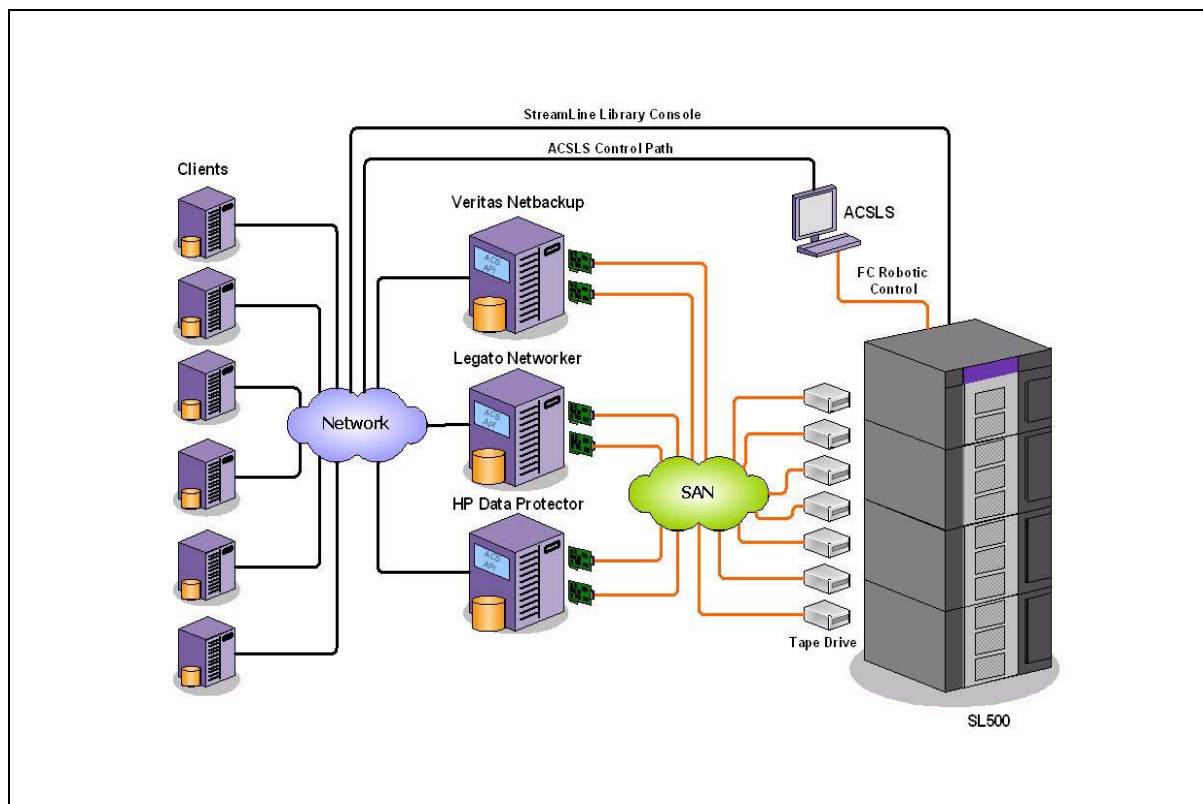
Note – The same library management software the customer currently has and is familiar with *today* can be upgraded to support the SL500 library.

Automated Cartridge System Library Software

Automated Cartridge System Library Software (ACSLS) is an open systems software package that manages library contents and controls library hardware to mount and dismount cartridges on tape drives. This application provides library management services such as cartridge tracking, pooling, reports, and library control.

Note: ACSLS 7.1.x or higher is required.

FIGURE 1-18 ACSLS Example



Independent Hardware and Software Vendors

For the most current list of independent hardware and software vendors:

1. Go to http://extranet.stortek.com/interop/interop?cmd=short_matrix
2. In the Disk and Library window, select STK:SL500 and any other filters.
3. Click the Get Summary button.
4. Review the Summary Report or click on the Detailed Report button for more information.

Tape Drives and Cartridges

See [Appendix A](#) or refer to the tape drive publications for information about the tape drives.

Safety Features

The SL500 library has a combination of safety features throughout the library, which include:

- Key to open and lock front door
- Robotics retracted and in a parked position
- Protective modules for the logic cards
- Cooling fans to prevent an overheating condition

Front Door and Robotics

The robot is retracted into the park zone in the robotics unit when the front door is open. Plus, you must use a key to open the front door.

To open the front door:

1. Press the Door Open button on the keypad.
 - The software allows the current job to complete.
 - The software parks the robot by retracting it into the robotics unit.
2. When the Door Open indicator light turns on, use the key to open the door.

The front door must be opened with a key to make sure that the data is secure. If the door is not fully closed, a sensor relays the condition to the software for security and safety reasons.

Power is removed from the robot to prevent someone's hand from being injured.

Cards and Power Supply

The RLC card, interface card, and the power supply are housed inside protective modules to prevent you from coming into contact with hazardous voltages and sensitive electronics.

Cooling Fans

The library has two cooling fans that provide cooling for the library electronics.

The tape drives and power supplies have their own fans.

Specifications

The following tables list the specifications for the rack, library and tape drives. See [FIGURE 4-1 on page 85](#) and [FIGURE 4-2 on page 86](#) for library and rack dimensions.

Note – In the following table, HP is a registered trademark of Hewlett-Packard Company. IBM is a registered trademark of International Business Machines. SDLT is a trademark of Quantum Corporation.

TABLE 1-5 Library Component Weights

Component	Weight
Base module with 1 power supply, 2 tape drives, and robotics unit	44.5 kg (98.0 lb)
Drive expansion module (DEM) with 1 power supply and 4 tape drives	41.3 kg (91.0 lb)
Cartridge expansion module (CEM)	20.1 kg (44.2 lb)
Robotics unit	10.1 kg (22.2 lb)
Power supply	2.3 kg (5.1 lb)
HP® LTO Ultrium tape drive and tray assy	3.6 kg (7.9 lb)
IBM® LTO Ultrium tape drive and tray assy	4.5 kg (9.9 lb)
SDLT™ LVD tape drive and tray assy	4.2 kg (9.3 lb)
SDLT FC tape drive and tray assy	4.1 kg (9.0 lb)
DLT-S4 tape drive and tray assembly	3.92 kg (8.65 lb)
Tape drive tray assy without tape drive	1.5 kg (3.4 lb)
LTO Ultrium cartridge	221 g (7.8 oz)

TABLE 1-6 Environmental Specifications

Item	Measurements		
	Operating	Storage	Transporting
Temperature	10 to 40°C (50 to 104°F)	10 to 40°C (50 to 104°F)	-40 to +60°C (-40 to +140°F)
Humidity	20 to 80%	10 to 95%	10 to 95%
Wet bulb (maximum, non-condensing)	+29.2°C (+84.5°F)	+35°C (+95°F)	+35°C (+95°F)
Altitude	-76 to 3,048 m (-250 to 10,000 ft)		

TABLE 1-7 Library Power *without* Tape Drives

Item	Specification
Input voltage	100–240 VAC, single phase
Frequency	50/60 Hz
Maximum library power consumption	1.4 A @ 120 V or 0.8 A @ 240 V
Maximum heat output	614 Btu/hr
Voltage-amperes	180 VA

TABLE 1-8 Library Power *with* Two LTO Tape Drives

Item	Specification
Input power	219 Watts
Input voltage-amperes	226 voltage-amperes
Input current (100 VAC)	2.3 amperes
Input current (120 VAC)	1.9 amperes
Input current (240 VAC)	0.9 amperes
Btu/hour	748 Btu/hr

TABLE 1-9 Library Power *with* Four LTO Tape Drives

Item	Specification
Input power	288 Watts
Input voltage-amperes	297 voltage-amperes
Input current (100 VAC)	3.0 amperes
Input current (120 VAC)	2.5 amperes
Input current (240 VAC)	1.2 amperes
Btu/hour	983 Btu/hr

Regulatory Agencies

The following regulatory agencies have tested and certified the SL500 library.

- Certified by Underwriters Laboratories Inc. (UL) to Standard for Information Technology Equipment -- Safety -- Part 1: General Requirements
- UL 60950-1 First Edition
- CAN/CSA-C22.2 No. 60950-1-03 First Edition
- EN 60950-1 (IEC 60950-1:2001, modified)
- CB Scheme in compliance to international Certified Body Scheme requirements with all national deviations

EN60950-1:2001 Statement

The following statement pertains to products that require a ground connection at the wall outlet.

Norway: Apparatet må tilkoples jordet stikkontakt Finland: Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan Sweden: Apparaten skall anslutas till jordat uttag Denmark: For tilslutning af de øvrige ledere, se medfølgende installationsvejledning.
--

Electromagnetic

Configuration used for verification and compliance in an SL500 Modular Library with a TCP/IP connection and 2 to 18 tape drives:

- Federal Communications Commission (FCC) in compliance to the requirements of FCC 47, Part15, Subpart B and Unintentional Radiators Class A
- Voluntary Control Council for Interference (VCCI) (Japan) in compliance to VCCI Class A (Cispr22)
- Australia/New Zealand (C-Tick Mark) in compliance to requirements of the Australia/New Zealand EMC Framework AS/NZS 3548: 1995 Class A
- European Community (CE Mark) in compliance to the requirements of Electromagnetic Compatibility Directive 89/336 (including all amendments).
- Canadian Emissions (ICES) in compliance to the requirements of Canada's Interference Causing Equipment Standard ICES-003 Class A.
- Taiwan (BSMI) in compliance to the requirements of Canada's Interference Causing Equipment Standard ICES-003 Class A.
- Korea in compliance to the requirements of Korean EMC Law.

Fiber-optic

Each fiber-optic interface in this Sun StorageTek Fibre Channel equipment contains a laser transceiver that is a Class 1 Laser Product.

Note – Each laser transceiver has an output of less than 70 μ W.

Sun StorageTek's Class 1 Laser Products comply with EN60825-1:1994+A1+A2 and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.



Warning – Possible Physical Injury. Use of controls or adjustment or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Fiber-optic Laser Product Label

In accordance with safety regulations, a label on each StorageTek Fibre Channel product identifies the laser class of the product and the place and date of the manufacturer. The label appears on top of a Fibre Channel tape drive and near the Fibre Channel connectors on a Fibre Channel tape library. A copy of the label is shown here:

CLASS 1 LASER PRODUCT LASER KLASSE 1 APPAREIL A LASER DE CLASSE 1 COMPLIES WITH 21 CFR 1040.10 AND 1040.11

The following translations are for users in Finland and Sweden who wish to identify laser safety and classification:

CLASS 1 LASER LUOKAN 1 LASERLAITE KLASSE 1 LASER APPARAT
--

Warranties

The initial warranty period for the SL500 is:

- 5-by-9 next business day service level
- Monday through Friday 8:00 a.m. to 5:00 p.m. Mountain time
- 12 months from installation

Training and Publications

The following tables list the training and publications that are available for the SL500.

TABLE 1-10 Training and Course Descriptions

Description	Intended Audience	Course Number
<i>Principles of Operation</i> This is a Web-based pre-requisite for the Field Service and Frontline Training course.	<ul style="list-style-type: none"> ■ System engineers ■ Technical specialists ■ Service representatives 	CRS-101841
<i>Field Service and Frontline Training</i> This course addresses basic installation, operation, and troubleshooting concepts.	<ul style="list-style-type: none"> ■ System engineers ■ Technical specialists ■ Service representatives 	ISTK-1840
<i>SE Training</i> Contact <i>Global Learning Solutions</i> for information about specific classes and dates or log-on to the Learning Network at: http://learning.stortek.com/	<ul style="list-style-type: none"> ■ System engineers ■ Account executives ■ Technical specialists ■ Service representatives ■ Marketing and sales representatives 	
<i>Sales Training</i> Contact <i>Global Learning Solutions</i> for information about specific classes and dates or log-on to the Learning Network at: http://learning.stortek.com/	<ul style="list-style-type: none"> ■ System engineers ■ Account executives ■ Technical specialists ■ Service representatives ■ Marketing and sales representatives 	

Note – Trained and qualified representatives must be available to install and maintain the SL500 library. To be qualified, they must take the appropriate training classes listed above.

TABLE 1-11 Publication Descriptions

Description	Intended Audience	Part Number
<i>Base Module Card</i> <i>Cartridge Expansion Module Card</i> <i>Drive Expansion Module Card</i> Used to assist qualified installers with installation and basic configuration of each module.	<ul style="list-style-type: none"> ■ Professional services ■ Technical specialists ■ Service representatives 	96121 96182 96178
<i>Customer Orientation Checklist</i> Provides a checklist for the installer to use to help the customer become familiar with the library.	<ul style="list-style-type: none"> ■ Professional services ■ Technical specialists ■ Service representatives 	96200
<i>Diagnostics/Troubleshooting Guide</i> Provides procedures and tests to help resolve problems.	<ul style="list-style-type: none"> ■ Technical specialists ■ Service representatives 	96153
<i>Installation Manual</i> Describes how to install the SL500.	<ul style="list-style-type: none"> ■ Professional services ■ Technical specialists ■ Service representatives 	96114
<i>Interface Reference Manual</i> Describes the small computer system interface (SCSI) commands used in the Fibre Channel interface.	<ul style="list-style-type: none"> ■ Independent software vendors (ISVs) ■ Professional services ■ Technical specialists 	96122
<i>Local Operator Panel Guide</i> Provides the screen shots and descriptions of the functions that are performed on the local operator panel.	<ul style="list-style-type: none"> ■ Operators ■ System administrators ■ Service representatives 	96258
<i>Principles of Operation Manual</i> Provides information about: <ul style="list-style-type: none"> ■ Library configurations and modules ■ Modes of operation ■ Descriptions of components and robotic functions 	<ul style="list-style-type: none"> ■ Technical specialists ■ Service representatives 	96156
<i>Replaceable Parts Catalog</i> Combines illustrated parts catalog plus removal and replacement procedures on a CD-ROM.	<ul style="list-style-type: none"> ■ Technical specialists ■ Service representatives 	96120
<i>Systems Assurance Guide and Site Preparation Kit</i> Provides an overview about the SL500 library and the system assurance process. This guide and kit also contain a customer site survey questionnaire, site preparation checklist, and tables with the part numbers for ordering the library components.	<ul style="list-style-type: none"> ■ System engineers ■ Account executives ■ Professional services ■ Technical specialists ■ Service representatives ■ Marketing and sales representatives 	Guide: MT9212 Kit: TM0001
<i>User's Guide</i> Is intended for users of the library and contains information that can be useful to system administrators. Most of the information applies to library hardware and related operations.	<ul style="list-style-type: none"> ■ Operators ■ System administrators ■ Service representatives 	96116

System Assurance

The system assurance process is the exchange of information among team members to make sure that no aspects of the sale, order, installation and implementation for the SL500 Library are overlooked. This process promotes an error-free installation and contributes to the overall customer satisfaction.

The system assurance team members (customer and Sun) make sure that all aspects of the process are planned carefully and performed efficiently.

This process begins when the customer accepts the sales proposal. At this time, a Sun representative schedules one or more system assurance planning meetings.

System Assurance Planning Meetings

The purpose of the system assurance planning meetings are to:

- Introduce the customer to the Sun StorageTek SL500 Library
- Explain the system assurance process and establish the team
- Identify and define the customer requirements
- Identify the configurations
- Complete the order
- Prepare for the installation and implementation

TABLE 2-1 System Assurance Task Checklist

Task	Completed?
Introduce the Sun team to the customer.	Yes <input type="checkbox"/> No <input type="checkbox"/>
Complete the Team Member Contact sheets in this chapter.	Yes <input type="checkbox"/> No <input type="checkbox"/>
Review and complete Chapter 3, "Site Survey" (also in the site kit TM0001)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Review and complete Chapter 4, "Site Preparation" (also in the site kit TM0001)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Complete the ordering pages in Chapter 5, "Ordering"	Yes <input type="checkbox"/> No <input type="checkbox"/>
Determine the installation schedule:	Yes <input type="checkbox"/> No <input type="checkbox"/>

Customer Team Member Contact Sheet

Complete the following with information about the customer team members:

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Sun Team Member Contact Sheet

Complete the following with information about the Sun team members:

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Name:	
Title:	
Telephone Number:	
FAX Number:	
Cell Phone / Pager:	
E-mail Address:	

Site Survey

This chapter provides space where you can record the different platforms, applications, and hardware configurations your customer *currently* has.

The type of information you need to gather includes:

- “System Configuration” on page 67
- “Applications” on page 70
- “Databases” on page 72
- “Hardware Configurations” on page 73
 - “Library” on page 73
 - “Tape Drives” on page 74
 - “Cartridge Tapes” on page 75
 - “Network” on page 76
 - “Cables and Connectors” on page 78

Connectivity Matrix

Not sure if your customer's hardware or software of choice supports the SL500 library?

Go to the InteroperabilityWeb site at:

<http://extranet/interop/interop>

This site allows you to search the Connectivity Matrix by application, interface, operating system, network component, and product.

System Configuration

Use the following two pages to record information about the customer's operating systems and configurations.

TABLE 3-1 Questions About the Customer's Operating Systems

Question	Answer
<p>1. How many and what types of operating systems or platforms does the customer have?</p> <p>Open-Systems:</p> <ul style="list-style-type: none"> ■ Windows: 2000, NT Make and model: Quantity: ■ UNIX: Solaris, AIX, HP-UX Make and model: Quantity: ■ Linux Make and model: Quantity: <p>Main-Frame:</p> <ul style="list-style-type: none"> ■ MVS Make and model: Quantity: ■ VM Make and model: Quantity: <p>Other (Specify):</p> <ul style="list-style-type: none"> ■ Make and model: Quantity: 	
<p>2. Are there plans for:</p> <ul style="list-style-type: none"> ■ New purchases? ■ Future upgrades? ■ If so, what? 	
<p>3. How many systems/servers are used as:</p> <ul style="list-style-type: none"> ■ Backup servers? ■ File servers? ■ Print servers? ■ Exchange servers? 	

TABLE 3-2 Current System Configuration

System _____	Processor _____	Processor _____
Vendor make and model		
Operating system type		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		
System _____	Processor _____	Processor _____
Vendor make and model		
Operating system		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		
System _____	Processor _____	Processor _____
Vendor make and model		
Operating system		
Version number and patch level		
Number of channels		
IP address		
HBA vendor and model		
HBA firmware versions		
Switch make and model		
Switch and port numbers		

Applications

Use these two pages to record information about the customer's applications.

TABLE 3-3 Questions About the Customer's Applications

Question	Answer
1. How are backups performed, manually or automatically?	
2. How many servers or systems perform backups?	
3. On what days are backups performed?	
4. What types of backups are performed and when?	
<ul style="list-style-type: none"> ■ Full ■ Incremental ■ Differential 	
5. How many hours are available for:	
<ul style="list-style-type: none"> ■ Full backups ■ Daily Backups 	
6. How much data is backed up:	
<ul style="list-style-type: none"> ■ Per day ■ Per week ■ Per month 	
7. What percentage of data changes daily?	
8. Are backup windows being met?	
9. How long does it actually take?	
10. How long should a backup take?	
11. Is a different backup schedule needed?	
12. How long does the customer keep the different levels of backed up data?	
13. How many copies are made, including the original?	
14. How many copies are archived?	
15. How often are restores necessary?	
16. Why are restores necessary?	
17. What are the restore requirements?	
18. What are the restore objectives?	

TABLE 3-4 Current Backup and Archive Software

Selection	Type of Backup and Archive Software	Version
<input type="checkbox"/>	Veritas NetBackup	
<input type="checkbox"/>	IBM Tivoli Storage Manager (TSM)	
<input type="checkbox"/>	Legato NetWorker	
<input type="checkbox"/>	CA Brightstor	
<input type="checkbox"/>	HP Omniback	
<input type="checkbox"/>	Commvault Galaxy	
<input type="checkbox"/>	E-Mail Archive	
<input type="checkbox"/>	ASM NT	
<input type="checkbox"/>	ASM UNIX	
<input type="checkbox"/>	Other (Specify)	
<input type="checkbox"/>	Other (Specify)	

TABLE 3-5 Current Network Management Software

Selection	Type of Management Software	Version
<input type="checkbox"/>	Veritas	
<input type="checkbox"/>	IBM Tivoli NetView	
<input type="checkbox"/>	HP OpenView	
<input type="checkbox"/>	HP SUNNet	
<input type="checkbox"/>	Horizon Library Monitor	
<input type="checkbox"/>	RMS/GSM	
<input type="checkbox"/>	Other (Specify)	
<input type="checkbox"/>	Other (Specify)	

TABLE 3-6 Current Library Attachment Software

Selection	Type of Attachment Software	Version
<input type="checkbox"/>	ACSLs	
<input type="checkbox"/>	ACSLs HA	
<input type="checkbox"/>	Direct SCSI	
<input type="checkbox"/>	Fibre Channel	
<input type="checkbox"/>	Other (Specify)	

Databases

Use this page to record information about the customer's databases.

TABLE 3-7 Questions About the Customer's Database

Question	Answer
1. How much primary storage exists? Total capacity.	
2. What type and size of disk drives does the customer have? Make: Model: Capacity: Quantity:	
Make: Model: Capacity: Quantity:	
3. What is the RAID configuration? 4. What type of failover product and version is the customer using?	
5. Does all primary storage require backup? If not, how much does? 6. Are additional storage devices needed?	
7. What database management system does the customer have? 8. What types of databases need backups? 9. What is the size of the smallest database? 10. What is the size of the largest database? 11. How often does the customer back up each database?	
12. What type of data is the customer backing up? 13. How valuable is the data in each database? 14. Do the different databases have different backup requirements?	
15. How is the customer currently protecting the databases (tape backup, mirroring, snapshot)? 16. If mirroring, how many mirrors? 17. Is mirroring installed because failover is required?	

Hardware Configurations

Use the remainder of this chapter to record any existing hardware.

- Does the customer have any existing libraries? ☐ Yes ☐ No
- Does the customer have any existing tape drives? ☐ Yes ☐ No
- Does the customer have any existing media for reuse? ☐ Yes ☐ No
- Does the customer have an existing storage area network? ☐ Yes ☐ No
- Are migration services required? ☐ Yes ☐ No

Library

- Will this library be replacing existing libraries? ☐ Yes ☐ No
- Will this library be replacing existing Sun StorageTek libraries? ☐ Yes ☐ No
- If so, what are the module numbers? _____

TABLE 3-8 Existing Libraries

Libraries	Description	Quantity
Manufacturer		
Make and model		
Cartridge capacity		
Manufacturer		
Make and model		
Cartridge capacity		
Manufacturer		
Make and model		
Cartridge capacity		

Tape Drives

The SL500 supports LTO, SDLT, and DLT-S4 tape drives as described in [Appendix A](#). If the customer has other types of tape drives, media migration services are required.

- Does the customer have existing Sun StorageTek tape drives? ☐ Yes ☐ No
- Does the customer need more tape drives? ☐ Yes ☐ No
- What types of drives are needed? _____

TABLE 3-9 Existing Tape Drive Types

Tape Drive Type	Yes	No	Vendor
3480 or 3490-type devices (18/36 track)	<input type="checkbox"/>	<input type="checkbox"/>	
DLT 7000 or 8000	<input type="checkbox"/>	<input type="checkbox"/>	
Sun StorageTek T9840 or T9940	<input type="checkbox"/>	<input type="checkbox"/>	
SDLT 320 or 600	<input type="checkbox"/>	<input type="checkbox"/>	
DLT-S4	<input type="checkbox"/>	<input type="checkbox"/>	
LTO Generation 1, 2, 3 or 4	<input type="checkbox"/>	<input type="checkbox"/>	

TABLE 3-10 New Tape Drives

Tape Drives	Description	Quantity
Manufacturer		
Make and model		
Manufacturer		
Make and model		
Manufacturer		
Make and model		

Does the customer need to migrate from one tape drive technology to another?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does the customer need help relocating cartridge tapes, tape drives, and racks?	<input type="checkbox"/> Yes <input type="checkbox"/> No

See [“Data Center Services” on page 80](#) for more information.

Cartridge Tapes

- Approximately, how many cartridge tapes does the customer have? _____
- Does the customer need more tapes? ☐ Yes ☐ No
- Data cartridges? ☐ Yes ☐ No
- Cleaning cartridges? ☐ Yes ☐ No
- Are all cartridge tapes labeled with “*approved*” labels? ☐ Yes ☐ No

TABLE 3-11 Existing Cartridge Tapes

Cartridge Tapes	Description	Quantity
Data cartridge type		
Manufacturer		
Data cartridge type		
Manufacturer		
Data cartridge type		
Manufacturer		
Data cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		
Cleaning cartridge type		
Manufacturer		

Does the customer need to migrate old data or technology to LTO?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does the customer need help relocating cartridge tapes to the new library?	<input type="checkbox"/> Yes <input type="checkbox"/> No

See “[Data Center Services](#)” on page 80 for more information.

Network

- Does the customer have an existing storage area network? ☐ Yes ☐ No
- Are additional network devices required? ☐ Yes ☐ No
- What are they? _____
- Does the customer use *zones* in the network? ☐ Yes ☐ No
- Are there frequent reconfigurations of the network? ☐ Yes ☐ No
- Are there multiple floors involved with this network? ☐ Yes ☐ No
- Are there inter-connections of hubs and switches? ☐ Yes ☐ No
- Are there remote connections to hubs and switches? ☐ Yes ☐ No
- Is this a campus network? ☐ Yes ☐ No
- Are trunk cables used? ☐ Yes ☐ No
- Are patch panels used? ☐ Yes ☐ No

TABLE 3-12 Fibre Channel Switches

Information	Switch 1	Switch 2	Switch 3
Manufacturer			
Make and model			
Software version			
Speed			
Number of ports			
Port types			
GBIC module types			
Number of open ports			
IP addresses			
IP addresses			

TABLE 3-13 Ethernet Hubs and Switches

Information	Hub/Switch 1	Hub/Switch 2	Hub/Switch 3
Manufacturer			
Make and model			
Number of ports			
Software version			
Speed			
Duplex			
Number of open ports			
IP addresses			
IP addresses			

TABLE 3-14 Fibre Channel Switch Connections

FC Switch Information	Switch 1	Switch 2	Switch 3
Vendor			
Model number			
Port 0 connection and status			
Port 1 connection and status			
Port 2 connection and status			
Port 3 connection and status			
Port 4 connection and status			
Port 5 connection and status			
Port 6 connection and status			
Port 7 connection and status			
Port 8 connection and status			
Port 9 connection and status			
Port 10 connection and status			
Port 11 connection and status			
Port 12 connection and status			
Port 13 connection and status			
Port 14 connection and status			
Port 15 connection and status			
Port 16 connection and status			
Port 17 connection and status			
Port 18 connection and status			
Port 19 connection and status			
Port 20 connection and status			
Port 21 connection and status			
Port 22 connection and status			
Port 23 connection and status			
Port 24 connection and status			
Port 25 connection and status			
Port 26 connection and status			
Port 27 connection and status			
Port 28 connection and status			
Port 29 connection and status			
Port 30 connection and status			
Port 31 connection and status			

Cables and Connectors

Note – Plan for 1 to 2 m (3 to 7 ft) of slack cable for limited movement and routing.

TABLE 3-15 Cables and Connectors

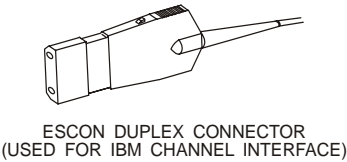
Type	Connector	Length	Quantity
Fibre Channel			
9 micron fiber-optic	LC-to-LC		
	LC-to-SC		
Other (specify)			
50 micron fiber-optic	LC-to-LC		
	LC-to-SC		
	LC-to-ST		
Other (specify)			
Fibre Channel copper	DB-9		
	HSSDC		
Ethernet (CAT5E)	RS-232		
Other (specify)			
SCSI (list the connector, length, and quantity)			

Note – The SL500 library and tape drives use only SCSI LVD high density connectors and Fibre Channel LC connectors. If the customer uses other types of cables and connectors, a new cable plan should be created.

FIGURE 3-1 shows several types of connectors for identification purposes only.

FIGURE 3-1 Connector Types - Identification Chart

FIBER OPTIC CONNECTOR TYPES



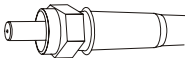
ESCON DUPLEX CONNECTOR
(USED FOR IBM CHANNEL INTERFACE)



FDDI DUPLEX CONNECTOR
(USED FOR STORAGETEK CONTROL INTERFACE)



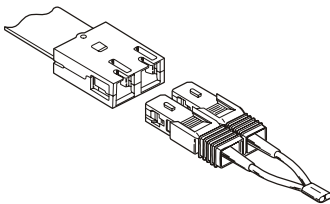
ST PHYSICAL-CONTACT CONNECTOR
(COMMONLY USED IN PATCH PANELS)



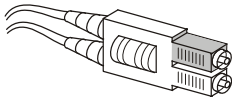
SMA CONNECTOR



BICONIC NONPHYSICAL-CONTACT CONNECTOR

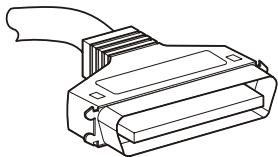


LC DUPLEX CONNECTOR

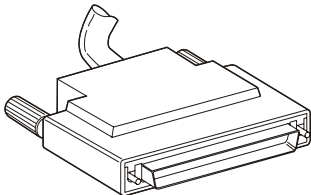


SC DUPLEX CONNECTOR

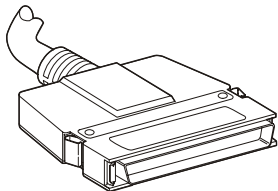
SCSI CONNECTOR TYPES



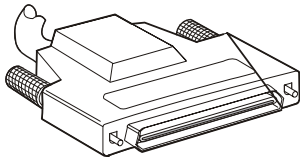
50-PIN SPRING LATCH
CENTRONICS CONNECTOR



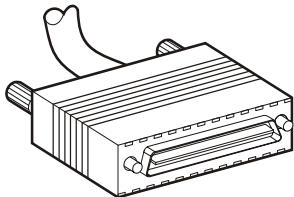
68-PIN HIGH DENSITY
JACKSCREW CONNECTOR (STANDARD)



50-PIN HIGH DENSITY
LATCH BLOCK AND RAIL CONNECTOR



68-PIN VERY HIGH DENSITY
JACKSCREW CONNECTOR (68 VHDC)



68-PIN MINI-CENTRONICS CONNECTOR

Data Center Services

Whether your customers needs a new data center, a relocation, or an audit, Data Center Services (DCS) has the resources to analyze, plan and manage a project of any size.

In the information-gathering phase, DCS gathers information about your customer's environment and requirements from audits, network maps, equipment inventories, and staff interviews. We determine the scope of work and resources required. DCS validates the requirements and formally state their findings in reports, executive summaries, and project plans. Once the scope, methods, and deliverables are agreed upon, DCS manages the project through completion.

Data Center Services are available for Sun and non-Sun customers, for both short- and long-term projects.

Offerings:

- Hardware relocation and asset swaps
- Asset management
Identify assets of a data center and place them into a controllable state
- Custom cabling, connectivity, conveyance, and design
Provide cabling infrastructure to optimize performance, maintenance, and migration to emerging technologies.
- Media services
Relocate tapes and racks, and/or convert one form of media to another.
- Infrastructure services
Design, remodel and optimize existing facilities.
- Data center project management

For more information, contact your local Professional Services and Data Center Services representative or visit

<http://www.storagetek.com/services.html>

Site Preparation

This chapter contains a site planning checklist to help prepare for an SL500 Modular Library System installation.

Site Planning Checklist

Make sure that the entire route of your staging will accommodate the width of the pallets, and, if applicable, the overall height of the rack and pallet jack.

TABLE 4-1 Site Planning Checklist

Question	Completed	Comments:
Delivery and Handling Factors		
Does the customer have a delivery dock? If <i>no</i> , where will the equipment be delivered?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
If a delivery dock is available, what are the hours of operation?	_____	
Are there street or alley limitations that may hinder delivery?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Will people be available to handle the delivery of the library?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Will equipment be available to handle the library (forklifts and/or pallet jacks)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are the ramp angles less than 10 degrees?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is the dock close to the computer room where the library will be installed?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is an elevator available to move the library to the appropriate floor?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is there a staging area where the library can be placed with access to the installation site?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Physical Placement Factors		
Does the site have raised flooring? Has the floor been laser-leveled or within 1 to 2 degrees level?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	

TABLE 4-1 Site Planning Checklist (Continued)

Question	Completed	Comments:
If a rack was ordered, are there door height limitations to be aware of?	Yes <input type="checkbox"/> No <input type="checkbox"/>	The rack on a pallet with a pallet jack is 210 cm (6.9 ft) high.
If the customer's rack is being used, is its depth more than 80 cm (31.5 in.) but less than 94 cm (37 in.)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Contact Technical Support for optional rear support extensions, kit number 419930101.
Can the customer's floor support the weight of the library?	Yes <input type="checkbox"/> No <input type="checkbox"/>	See "Specifications" on page 57 for the weights of the different modules.
Does the customer have floor tile cutouts available for AC power, interface cables, and vented floor tiles for cooling?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Cutouts are placed at the rear of the library/rack. Vented tiles should be placed in front of the library.
Does the intended site have enough room to install and service the equipment?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Front and rear access: 61 cm (2 ft)
Are there plans for expansion? If so, when? Does the customer want to expand the: ■ Cartridge capacity? ■ Drive capacity?	Yes <input type="checkbox"/> No <input type="checkbox"/> Date: _____ Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	
Environmental Factors (See "Specifications" on page 57 for information.)		
Does the site meet the environmental requirements for: ■ Temperature? ■ Humidity? ■ Cooling? ■ Heat generated by the library?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Temperature: 10°–40°C (50°–104°F) Humidity: 20–80%, non-condensing
Does the site contain features and materials that guard against electrostatic discharge (ESD)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are there special requirements to dispose of or recycle the packing material, pallets, and cardboard?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Is space available for Sun spare parts and documentation?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Power Factors		
Does the intended site meet the power requirements for of the equipment?	Yes <input type="checkbox"/> No <input type="checkbox"/>	100–240 VAC, single phase, 50–60 Hz
Does the site have multiple, separate circuits for power redundancy?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Does the customer plan to use multiple branch circuits for redundancy?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Will new electrical wiring be needed? If new electrical wiring is necessary, will it require an inspection or an approval to satisfy local codes?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	
Connectivity Factors		
Note: Cabling is very important to establish a reliable network for the library and tape drives.		
Have you completed a cable plan?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

TABLE 4-1 Site Planning Checklist (Continued)

Question	Completed	Comments:
Have you determined the type and number of cables required? <ul style="list-style-type: none"> ■ Ethernet: host connections ■ Fibre Channel: data path and host ■ SCSI LVD: data path and host 	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	Each tape drive needs an interface connection (data path). Quantity: _____ Quantity: _____ Quantity: _____
Is the customer prepared to supply Ethernet cables for the network?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Can the customer provide the required number of static IP addresses?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Will interface cables be run from outside the computer room?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Cables that run outside a raised floor computer room require a flammability rating of CL2 or CL2P.
Will the customer allow Sun to use remote support?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Tape Drives		
Does the customer have the correct type and number of tape drives? Are additional tape drives required? How many?	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> _____	See Appendix A, "Tape Drives and Cartridges" for information about the tape drives.
Media Factors		
Does the customer have the correct type and number of cartridge tapes? <ul style="list-style-type: none"> ■ Are additional cartridges required? ■ Are cleaning cartridges required? ■ Are labels required? 	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	
Human Factors		
Where will the remote operator panel be located? (See "StorageTek Library Console" on page 50.)	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Does the customer need additional CAP magazines?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Any Comments and/or other Concerns:		

Preparing for the Installation

Site preparation is important to make sure that no aspects of the installation and implementation are overlooked and to promote an error-free installation. Considerations that you and the customer must make before the equipment arrives are outlined in the following sections.

Personnel

To install an SL500 library, you need at least *two qualified installers* to lift some of the components from the boxes and to lift the base unit into the rack. A lifting tool is available for the original-design modules to hold the base unit in the rack so that one person can install the front and back screws.

Installation tips are supplied in the *Installation Manual*.

Tools

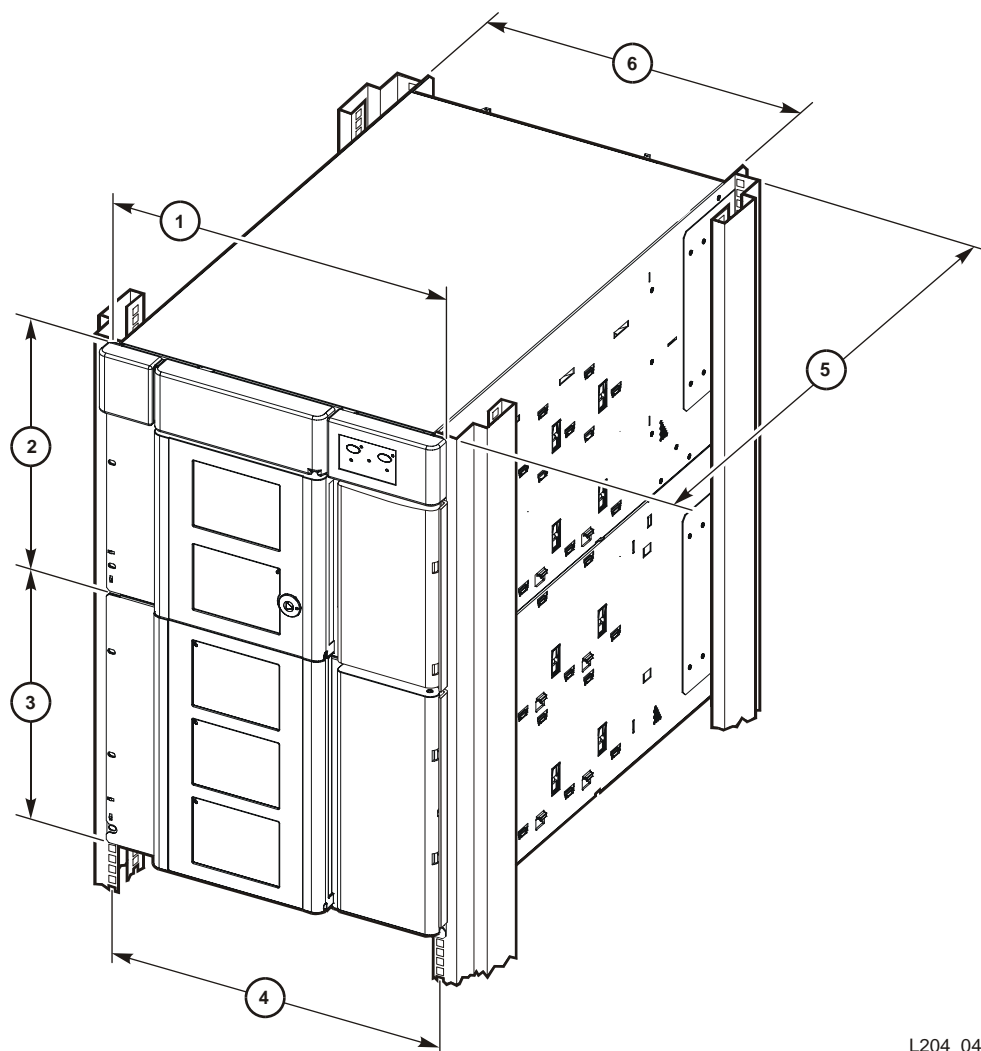
[TABLE 4-2](#) lists the tools used to install the library, both standard tools found in most tool kits and special tools, with Sun part numbers and quantity.

TABLE 4-2 Installation Tools

Tool	Part Number	Quantity
Standard Service Tool Bag Tools include: T10, T15, T20, and T25 Torx bits and driver, standard and Phillips screwdrivers, 1/8 Allen wrench, step stool, gloves, a flashlight and a lifting tool for the base unit.	24100250	1
Field Service Grounding Kit (ESD Kit)	4711	1
Optional SL500 install tool kit (temporarily installed in rack to support original design base unit)	314829201	A/R

Physical Planning

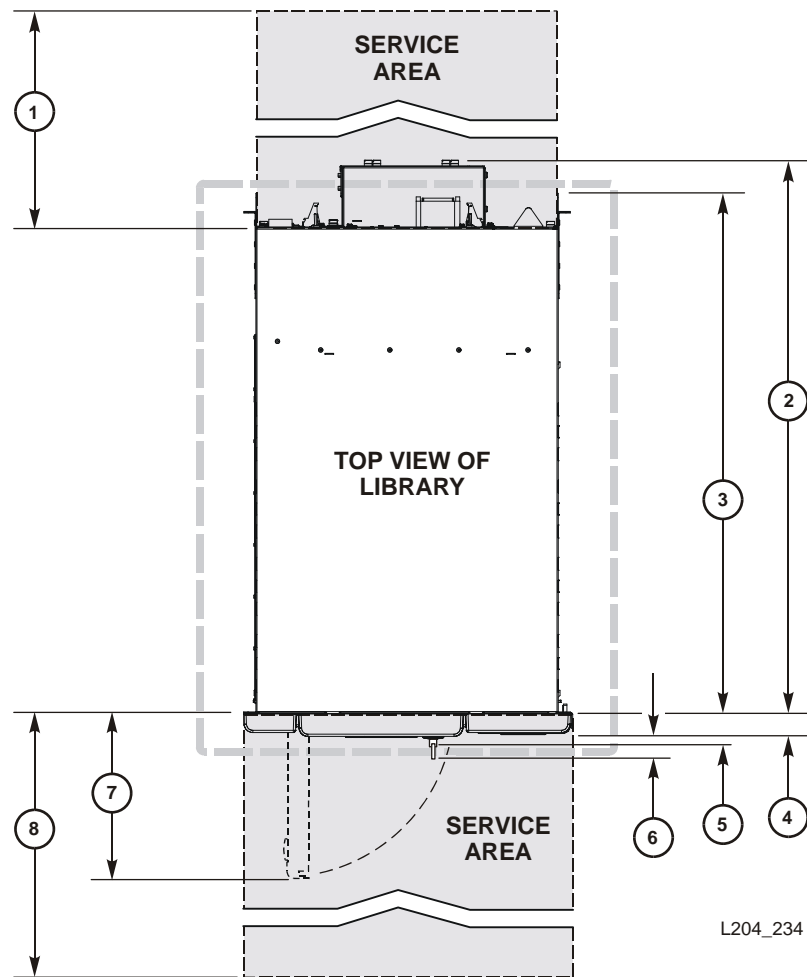
The following figures show the dimensions for the SL500 library.

FIGURE 4-1 Library and Rack Dimensions (Sheet 1 of 2)

L204_045

- 1.) 48.3 cm (19.0 in.) width of front of base module with flange 2.) 35.6 cm (14.0 in.) height of base module
- 3.) 35.6 cm (14.0 in.) height of expansion module 4.) 46.5 cm (18.3 in.) distance between rack holes
- 5.) *Original design modules (shown in figure):* 60.9 cm (24.0 in.) to 86.4 cm (34.0 in.), optimally 74 cm (29 in.) front to rear rack mounting distance
EZ install modules: 55.9 cm (22.0 in.) to 78.7 cm (31.0 in.), optimally 66 cm (26 in.) front to rear rack mounting distance.
- Note: Extensions (optional accessory kit part 419930101) are available for rack depths up to 94 cm (37.0 in.). Contact Technical Support to order.
- 6.) 44.5 cm (17.5 in.) width of back of base module

FIGURE 4-2 Library and Rack Dimensions (Sheet 2 of 2)



1. 60.9 cm (2 ft) minimum service clearance behind the library or rack
2. 81.0 cm (31.9 in.) depth of base module from front mounting plane to back of tape drives
3. 76.2 cm (30.0 in.) depth of *original design* base module
71.4 cm (28.1 in.) depth of *EZ install* base module
4. 3.8 cm (1.5 in.) depth of front door, required clearance
5. 5.3 cm (2.1 in.) depth of front door and unique latch hardware
6. 5.9 cm (2.3 in.) key depth
7. 24.1 cm (9.5 in.) front door opening clearance
8. 60.9 cm (2 ft) minimum front service clearance

EZ Install Modules

The EZ install modules are easier to install into a rack because the arrays, doors, and front panels are already installed on the modules. The service representative installs rails and brackets into the rack and slides in the modules, then attaches them to the rack.

Caution – Compatibility issues: You can add the EZ install modules into a rack that has the original design modules, but you *cannot* add the original design modules into a rack with all EZ install modules. See the following rules.

Customers who purchased the original design version of the library and who want to add modules can either:

- Order original design expansion modules
- Order EZ install modules
- Once an EZ install module has been installed, *only* EZ install modules can be installed *below that module*. See the following examples:
 - Base Module (original) DEM (original) DEM (EZ) CEM (original) **No**
 - Base Module (original) DEM (original) DEM (EZ) CEM (EZ) **Yes**

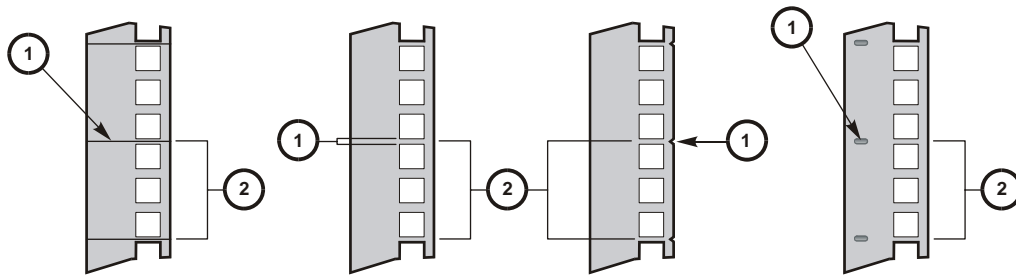
Customers who purchased the EZ install version of the library and who want to add modules *must* order only EZ install modules.

As with the original designed modules, the EZ modules are not customer-installable.

Rack Planning

The SL500 library is a rack-mountable library that requires a standard 483-mm (19-in.) rack or cabinet for installation.

Most racks contain units of measure which are called RU's (rack units). Each RU is equal to 44.5 mm (1.75 in.) and appear as a 3-hole pattern on the frame of the rack. For instance, some racks have numbers, notches, or markings to show where the top of the RU begins (see [FIGURE 4-3](#) for an example).

FIGURE 4-3 Rack Frames and Rack Unit Measuring Identification

L204_166

1. Where the RU starts

2. The 3-hole RU pattern

The installation manual provides detailed instructions about where to install rack hardware and the adjustable brackets.

AC Power Planning

Keep in mind the following power considerations:

- Plan the location for a second set of power wiring even if the customer is not purchasing the redundant power supply.
- Make sure that each power source is on a separate branch circuit.
- If the rack has a power distribution unit (PDU), plug each power cable from the power supply receptacle to the PDU, and then plug the PDU cable to the wall receptacle.
- If the rack does not have a PDU, plug each power cable from the power supply receptacle to the wall receptacle.

Remote Support

Sun Service Representatives are available to assist you and the customer with hardware and software problem resolution. During the initial order and installation planning, make sure that you inform the customer about Sun's local and remote support.

Does the customer want remote support? Yes ☐ No ☐

Ordering

This chapter describes the components and the Sun ordering part numbers for the SL500 Modular Library System. Some numbers are for ordering the initial library. X-options (upgrades) are kits of material and instructions that allow you to add a feature or an upgrade to the library *after* the base module has been installed.

Note – To add a module, the upper module must first have full capacity capability. As an example, to add a drive expansion or cartridge expansion module below a base module, the base module must have 50 (LTO-only) or 42 (multi-media) available cartridge slots. Licensed slots must be contiguous. Slots within a lower module will not be recognized unless the upper module is fully licensed.

As one example, if your customer wants an *LTO-only* base module with two HP LTO 3 drives, one drive expansion module (DEM), and one cartridge expansion module (CEM) for a SCSI interface, you must order:

- SL500-2L3-30-SC-Z (30-slot base module with two HP LTO 3 tape drives)
- X-SL500K-BASE30-50 (to upgrade the base module to 50-slots)
- X-SL500K-DEM-W1/3Z (to activate the first 1/3 slots in the DEM)
- *Two* X-SL500-1/SLOTUP X-options (to activate the second and third portions of the DEM)
- XSL500K-LCARTX -Z (to activate the CEM slots)

A second example—a *multi-media* base module (with one HP drive and one SDLT drive), one DEM, and one CEM for a Fibre Channel interface:

- SL500-MMBUN-24-FCZ
- XSL500K-MM-24-42-Z (to upgrade the base module to 42-slots)
- X-SL500K-MM-DREXP-Z (to activate the second and third portions of the DEM)
- *Two* X-SL500K-MM-1/3DEM-Z (to activate the first 1/3 slots in the DEM)
- X-SL500K-MM-CEM-Z (to activate the CEM slots)

To order additional tape drives, see “[Tape Drives](#)” on page 102.

Ordering is accomplished through the **Storage Integrated License Key System (SILKS)**

Web site: <https://silks.central.sun.com/silks>. Details of this process are supplied below.

SILKS Ordering

License key files are required for all new library installations and some upgrades. Any module or X-option that contains “KEY” in the short description or “MUST REQUEST LICENSE KEY” in the long description require a license key file be loaded to the SL500. The following rules must be followed to ensure proper license key file creation and delivery.

- **E-mail addresses:** In the footnotes section of your webdesk quotes, you must place all the e-mail addresses (limit of three addresses) where you want the license key file sent. The license key file needed for your order will be sent to all these addresses. The e-mail addresses can be Sales, Service, or customer resources. The license key file is customer installable so it can be sent directly to the customer if you wish. The e-mail addresses must be preceded by “LICENSE KEY FILE”.
- **Place only ONE library on any sales order/quote.** The reason for this requirement is that specific license keys must be created for each library. If two libraries are on the same order, it cannot be determined which features should be applied to each library.
- When ordering upgrades (after the initial installation) the **library serial number** must be entered into the footnotes area in webdesk. The e-mail addresses are also needed.
- **All new SL500 base libraries require a key** to be installed at the initial installation. Other parts that require licensing are the slot capacity parts, DEM/CEM, and partitioning. All of these parts contain “MUST REQUEST LICENSE KEY FILE” in the long description and “-KEY” in the short description.

Library with Base Module—LTO Only

The following table lists the part numbers for the library with a base module and LTO tape drives and arrays only.

Note – You must request a License key, RoHS-5, for all products.

TABLE 5-1 Base Module—LTO-only

Description	Part Number	
SCSI Interface		
SL500 with base module, 30 slots, SCSI interface Key	SL500-30-SCSI-Z	<input type="checkbox"/>
SL500 bundle with base module, 30 slots, SCSI interface, two HP LTO4 SCSI drives Key	SL500-30L4HPSC-Z	<input type="checkbox"/>
SL500 bundle with base module, 30 slots, SCSI interface, two IBM LTO4 4Gb SCSI drives Key	SL500-30L41BSCZ	<input type="checkbox"/>
Fibre Channel (FC) Interface		
SL500 with base module, 30 slots, FC interface Key	SL500-30-FC-Z	<input type="checkbox"/>
SL500 bundle with base module, 30 slots, FC interface, two HP LTO3 4Gb FC drives Key	SL500-2L34-30FC-Z	<input type="checkbox"/>
SL500 bundle base module with 30 slots, FC interface, two HP LTO4 4Gb FC drives Key	SL500-30L4HP4GFZ	<input type="checkbox"/>
SL500 bundle with base module, 30 slots, FC interface, two IBM LTO4 4Gb FC drives Key	SL500-30L41B4GFZ	<input type="checkbox"/>

Library with Base Module—Mixed Media

The following table lists the part numbers for the library with a base module and mixed-media (LTO/SDLT/DLT-S4) tape drives and arrays.

Note – You must request a License key, RoHS-5, for all products.

TABLE 5-2 Base Module—Mixed-Media

Description	Part Number	
SCSI Interface		
SL500 with base module, 24 slots, SCSI interface Key	SL500MM-24-SC-Z	<input type="checkbox"/>
SL500 with base module, 24 slots, SCSI interface, 1 HP LTO 4 drive and 1 SDLT 600 drive Key	SL500-MMBUN-24-SCZ	<input type="checkbox"/>

TABLE 5-2 Base Module—Mixed-Media (Continued)

Description	Part Number	
Fibre Channel (FC) Interface		
SL500 with base module, 24 slots, Fibre Channel interface Key	SL500MM-24-FC-Z	<input type="checkbox"/>
SL500 with base module, 24 slots, Fibre Channel interface, 1 HP LTO 4 4Gb drive and 1 SDLT 600 drive Key	SL500-MMBUN-24-FCZ	<input type="checkbox"/>

Upgrade (X-options)—All Libraries

The table below lists the upgrade or X-options available.

Note – You must request a License key, RoHS-5, for all products.

TABLE 5-3 Library and Module Upgrades (X-options)—All Libraries

Short Description	Long Description	X-option Number	
SL500 30-50 slots Key	<i>LTO-only:</i> takes base module from 30 to 50 active slots (the CAP is not counted in slot capacity and is an additional 5 slots).	X-SL500K-BASE30-50	<input type="checkbox"/>
SL500 DEM w/ 1/3 slots Key	<i>LTO-only:</i> DEM with <i>first</i> 1/3 slots activated ¹ .	X-SL500K-DEM-W1/3Z	<input type="checkbox"/>
SL500 1/3 DEM slots Key	<i>LTO-only:</i> key upgrade for access to second 1/3 and/or third 1/3 DEM slots ¹ .	X-SL500K-1/3SLOTUP	<input type="checkbox"/>
SL500 LTO CEM Key	<i>LTO-only:</i> cartridge expansion module (these modules do not contain drive bays).	X-SL500K-LCARTEX-Z	<input type="checkbox"/>
SL500 Mixed Media 24-42 slots Key	<i>Mixed Media:</i> takes base module from 24 to 42 active slots (the CAP is not counted in slot capacity and is an additional 4 slots).	XSL500K-MM-24-42-Z	<input type="checkbox"/>
SL500 Mixed Media DEM w 1/3 Key	<i>Mixed Media:</i> DEM with <i>first</i> 1/3 slots access ² .	X-SL500K-MM-DREXP-Z	<input type="checkbox"/>
SL500 Mixed Media DEM w/ additional 1/3 slots access Key	<i>Mixed Media:</i> DEM key upgrade for access to second 1/3 and/or third 1/3 DEM slots ² .	X-SL500K-MM-1/3DEM	<input type="checkbox"/>
SL500 Mixed Media CEM Key	<i>Mixed Media:</i> cartridge expansion module (these modules do not contain drive bays).	X-SL500K-MM-CEM-Z	<input type="checkbox"/>
SL500 Partitioning Key	Physical partitioning feature, up to 8 partitions allowed.	X-SL500K-PARTNG	<input type="checkbox"/>
<p>Notes: ¹ Up to three 1/3 licenses can be ordered. If this is the last module, the first two 1/3 licenses add 26 slots each and the third adds 25 slots. If there is a module below, increments are 28, 28, 28.</p> <p>² Up to three 1/3 licenses can be ordered. If this is the last module, slot counts increment by 21 for each 1/3 license. If there is a module below, increments are 24, 23, 23.</p>			

Partitioning License

The partitioning option for the SL500 library is listed below in [TABLE 5-4](#). When ordered, customers will receive an e-mail receipt of the feature they ordered and be referred to the *SL500 User's Guide* for installation procedures.

TABLE 5-4 Partitioning License Ordering

Description	X-option	
SL500 Partitioning License Key	X-SL500K-PARTNG	<input type="checkbox"/>

Library Interface Changes

The following table lists the part numbers to change the library interface.

TABLE 5-5 Library Interface Changes, SCSI and Fibre Channel

Description	X-option	
SCSI library interface to a Fibre Channel interface	XSL500-SCSI-FC-Z	<input type="checkbox"/>
Fibre Channel library interface to a SCSI interface	XSL500-FC-SCSI-Z	<input type="checkbox"/>

Local Operator Panel

An *optional* local touch screen operator panel can be mounted on the front of the library. This is a panel-mounted personal computer with a flat screen display and touchable interface—no mouse or keyboard is needed. The panel can be installed on the door, either in the bottom section of the base module or the middle section of the top expansion module.

The following table lists the part number to order the local operator panel.

TABLE 5-6 Local Operator Panel

Description	X-option	
Local operator panel	XSL500-TSOP-Z	<input type="checkbox"/>

Magazines

The following table lists the part numbers for the cartridge access port (CAP) magazines.

TABLE 5-7 Cartridge Access Port Magazines

Description	X-option	
Five-slot magazine for a CAP in an LTO-only library	XSL500-LTO-MAG5-Z	<input type="checkbox"/>
Four-slot magazine for a CAP in a mixed-media library	XSL500-MM-MAG4-Z	<input type="checkbox"/>

Rack Mount to Desktop Base Module

The following table lists the part number to change a rack mounted base module into a desktop version.

TABLE 5-8 Rack Mount to Desktop Base Module Conversion

Description	X-option	
Converts a rackmount base module into a desktop version	XSL500-DESKTP-KTZ	<input type="checkbox"/>

Rack

You can order a rack from Sun or from another vendor. The following table lists the Sun part numbers and feature codes.

TABLE 5-9 Sun Rack Cabinet Assembly

Description	Part Number	
Sun 42 RU, 19-inch rack cabinet assembly (Model SL-RACK-42-Z) ^{See Note 1}	CBNT42U	<input type="checkbox"/>
Sun 1000-38 rack with power distribution unit ^{See Notes 1 and 2}	SRK-XRS038A-IP	<input type="checkbox"/>
Note 1: PDU specifications for both racks: Two 240 VAC PDUs, 20 A, IEC C13 receptacles, IEC C20 input with current meter, mounted at left rear of enclosure (viewed from the rear).		
Filler panel kit (12 RU), optional but recommended	X6826A	<input type="checkbox"/>
Domestic power cord kit, 4 pack, order quantity 1	X6828A	<input type="checkbox"/>
Second power strip upgrade X-option	XSL-RACK-2STRIP-Z	<input type="checkbox"/>
Note 2: This rack offers added strength for installation of auxiliary equipment (disks, servers). The SL500 library and auxiliary equipment can be shipped installed within this cabinet.		

For cabinets or racks with a depth beyond 80.0 cm (31.5 in.) but not exceeding 94 cm (37 in.), rear support extensions for EZ Install modules are available. For *each* module, you must contact Technical Support and order an optional accessory kit part 419930101, which contains the following:

- 4 screws, part 10207301
- Right extension, part 4198851xx
- Left extension, part 4198853xx

Redundant Power Supply

The following table lists the part number to order a redundant power supply for the base module or drive expansion module.

If something within the AC power source or power supply fails, the second power supply provides power to the robotics and library electronics until the problem can be fixed. For redundancy, this power supply should be connected to a separate branch circuit.

Note – Be sure that you also order additional power cables, connected between the redundant supplies and the PDU.

TABLE 5-10 Redundant Power Supply

Description	X-option	
Redundant power supply	XSL500-RED-PWR-Z	<input type="checkbox"/>
Note: This X-option orders one redundant power supply. If, for example, you have a base module and one DEM, you would order one X-option for each module to supply full redundancy for both modules.		

Power Cord Numbers and Receptacles

The following tables lists power cord part numbers by country. All cords are 3 m (9.81 ft).

The receptacle type is listed also. Refer to your vendor catalog for the part number.

Note – If your country is not listed below, use the cord that you used on past products, such as the harmonized cord described in [TABLE 5-12 on page 96](#).

TABLE 5-11 Country-specific Power Cords

Input Voltage	Country	Part Number	Receptacle Type	
100 to 127 VAC	U.S./Canada	PWRCORD10187019-Z	5-15R	<input type="checkbox"/>
	Japan	PWRCORD10083243-Z	JIS C8303	<input type="checkbox"/>
200 to 240 VAC	Australia	PWRCORD10083244-Z	AS 3112	<input type="checkbox"/>
	Denmark	PWRCORD10083248-Z	DEMKO107/ 10-1973	<input type="checkbox"/>
	Europe	PWRCORD10187018-Z	Schuko	<input type="checkbox"/>
	Europe (Continental) See Note 3.	PWRCORD10187022-Z	IEC309	<input type="checkbox"/>
	Italy	PWRCORD10083245-Z	CEI 23-16/V11	<input type="checkbox"/>
	Korea	PWRCORD10083657-Z	KSC 8305	<input type="checkbox"/>
	South Africa	PWRCORD10083636-Z	BS546	<input type="checkbox"/>
	Switzerland	PWRCORD10083246-Z	CEE 7	<input type="checkbox"/>
	United Kingdom	PWRCORD10083247-Z	BS 1363	<input type="checkbox"/>
	U.S./Canada	PWRCORD10187020-Z	6-15R	<input type="checkbox"/>
Notes: 1. All power cords are approximately 3 m (10 ft). 2. Cabinets come equipped with two domestic or international power cords for the PDUs. However, you must order the correct number of power cables that run between each module's power supply and the PDU (see TABLE 5-12 on page 96). For example, if your U.S./Canada library contains a Base Module and one Drive Expansion Module, order two cables (PWRCORD10187055-Z); if this is a duplicate power configuration, you must order four cables. 3. This is a harmonic no plug cord for Belgium, Denmark, Finland, France, Germany, Holland, Norway, Sweden, and Switzerland.				

TABLE 5-12 Non-country-specific Power Cords

Input Voltage	Description	Part Number	
100 to 127 VAC	SJT IEC320 14AWG, 3 m, receptacle 5-15	PWRCORD10187061-Z	<input type="checkbox"/>
250 VAC	SJT 16 AWG L6-15P, C13, 2.5 m, receptacle L6-15P	PWRCORD10187024-Z	<input type="checkbox"/>
250 VAC	18, 3, SVT, 1mm, M/SH FRT	PWRCORD10187055-Z (for SL-RACK-42-Z rack)	<input type="checkbox"/>
	3, F, IEC320 harmonized ^{see Note}	PWRCORD10187047-Z	<input type="checkbox"/>
100 to 240 VAC	International power cord pigtail	PWRCORD10083735-Z	<input type="checkbox"/>
Note: This cord has a plug on one end that attaches to the library and bare wires on the other. Buy the correct end to match your normal wall outlet and attach it to the cord.			

Ethernet Cables

The library uses Ethernet cables for TCP/IP connections.

The following table lists the cables available through Sun.

TABLE 5-13 Ethernet Cables

Description	Part Number	
Cable assembly, CAT5E, 127 cm (50 in.) 24 AWG, shielded	CABLE10187035-Z	<input type="checkbox"/>
Cable assembly, CAT5E, 2.4 m (8 ft), 24 AWG, shielded	CABLE10187033-Z	<input type="checkbox"/>
Cable assembly, CAT5E, 10.5 m (35 ft), 24 AWG, shielded	CABLE10187034-Z	<input type="checkbox"/>

Interface Cables

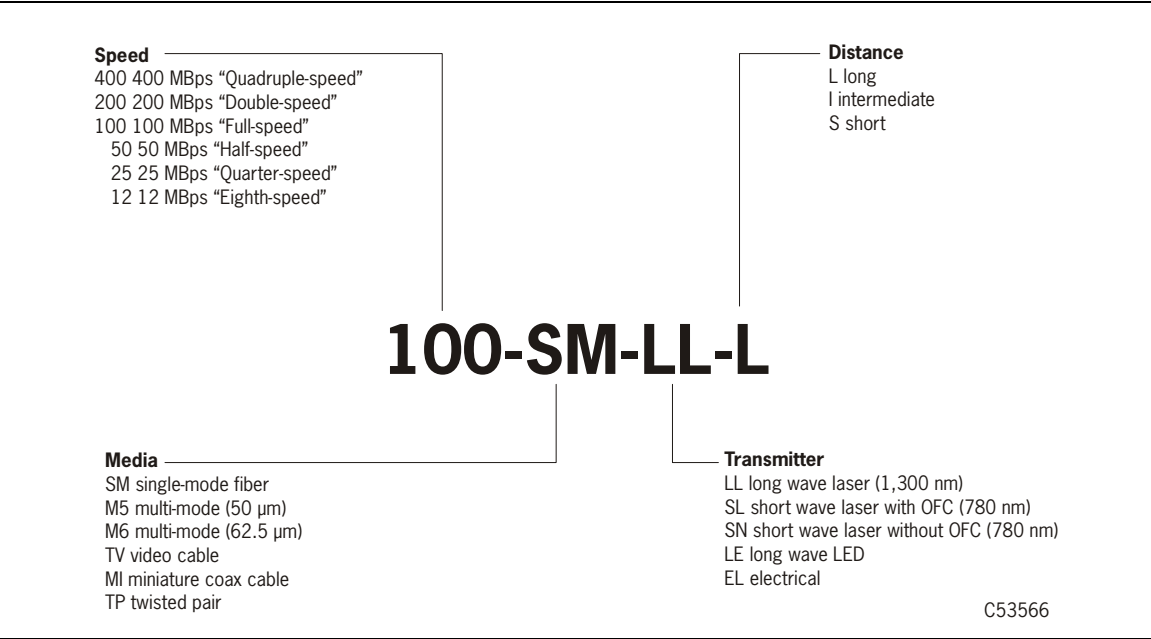
The following sections provide information about the different interface cables available through Sun. When you order cables, keep this in mind:

- **Riser cables** can be used in computer rooms. Riser cable materials are not classified according to flammability or toxic gas emissions.
- **Plenum cables** are designed for installation in air ducts and manufactured to meet UL standards for flammability to produce little smoke.

Fiber-optic Cables

[FIGURE 5-1](#) shows the classification for the technology options of a fiber-optic cable, which include speed, rated distance, mode, and type of transmitter.

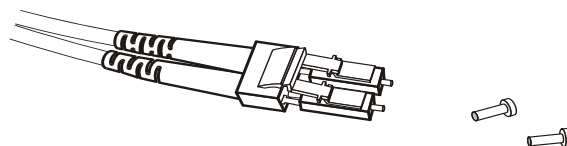
FIGURE 5-1 Fiber-Optic Cable Descriptions



Two Gigabit Fiber-Optic Cables

Two gigabit (50-micron) fiber-optic cables are orange with LC connectors. LC connectors (FIGURE 5-2) are the industry standard for all two gigabit Fibre Channel devices such as LTO tape drives. Both the library and tape drive interfaces use LC connectors. **Do not use 62.5 micron cables.**

FIGURE 5-2 LC Duplex Connector



The following table lists the part numbers for the two gigabit fibre-optic cables.

TABLE 5-14 Two Gigabit Fiber-Optic Cables

Description	Part Number	
LC to LC, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800310-Z	☐
50 m (164 ft) Duplex, Riser	CABLE10800311-Z	☐
100 m (328 ft) Duplex, Riser	CABLE10800312-Z	☐
10 m (32.8 ft) Duplex, Plenum	CABLE10800313-Z	☐
50 m (164 ft) Duplex, Plenum	CABLE10800314-Z	☐
100 m (328 ft) Duplex, Plenum	CABLE10800315-Z	☐
LC to SC, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800317-Z	☐
50 m (164 ft) Duplex, Riser	CABLE10800318-Z	☐
100 m (328 ft) Duplex, Riser	CABLE10800319-Z	☐
10 m (32.8 ft) Duplex, Plenum	CABLE10800320-Z	☐
50 m (164 ft) Duplex, Plenum	CABLE10800321-Z	☐
100 m (328 ft) Duplex, Plenum	CABLE10800322-Z	☐
LC to ST, 50/125 Micron		
10 m (32.8 ft) Duplex, Riser	CABLE10800247-Z	☐
50 m (164 ft) Duplex, Rise	CABLE10800248-Z	☐
10 m (32.8 ft) Duplex, Plenum	CABLE10800323-Z	☐
50 m (164 ft) Duplex, Plenum	CABLE10800250-Z	☐
Adapter Kit, LC to SC Cabling	CABLE315447901-Z	☐

SCSI Cables

You may choose to separate the control path and the data paths when planning for a SCSI installation.

- The control path transfers *commands* for *library robotic operations*.
- The data path transfers *data* to and from the *tape drives*.

At least one initiator (a server) and one target (a tape drive) must be on a bus. Depending on the type of SCSI implementation, you may have up to 16 devices connected to the same SCSI bus.

Important:

For the best performance, do *not* connect more than *two* tape drives on a single SCSI bus (called daisy-chaining).

The following table lists the part numbers for the SCSI universal interface cables.

TABLE 5-15 SCSI Universal Interface Cables

Description	Part Number	
SCSI, 68MD-68MD, 300 mm (11.8 in.)	CABLE10187004-Z	□
SCSI, 68MD-68MD, 500 mm (19.7 in.)	CABLE10187005-Z	□
SCSI, 68MD-68MD, 1 m (3.3 ft)	CABLE10187006-Z	□
SCSI, 68MD-68MD, 3 m (9.8 ft)	CABLE10187008-Z	□
SCSI, 68MD-68MD, 5 m (16.4 ft)	CABLE10187009-Z	□
SCSI, 68MD-68MD, 10 m (32.8 ft)	CABLE10187010-Z	□
SCSI, 68MD-68HD, 3 m (9.8 ft)	CABLE10187011-Z	□
SCSI, 68MD-68VHD, 5 m (16.4 ft)	CABLE10187012-Z	□
SCSI, 68MD-68VHD, 10 m (32.8 ft)	CABLE10187013-Z	□
LVD daisy-chain cable 300 mm (11.8 in.)	CABLE10083685-Z	□

SCSI Terminators

The following table lists the part numbers for the SCSI terminators.

TABLE 5-16 SCSI Terminators

Description	Part Number	
Pass-thru terminator for RLW/MPW card	CABLE10148029-Z	<input type="checkbox"/>
Standard LVD/SE terminator for SCSI tape drive	CABLE10148031-Z	<input type="checkbox"/>

Cartridges and Labels

Contact your authorized selling agent for Sun-approved labeled cartridges. See [“Ordering Cartridges” on page 109](#) for additional information.

Note – Your robotics unit must be part number 314558705 or higher to read SDLT cartridge labels.

Note – You must select the volume serial number (VOLSER) range and other label options when ordering cartridges. If you choose to order additional labels, order them from any standard media vendor.

Labels used in StorageTek libraries can be made by any vendor that produces a label that meets the Sun Label Specification. Some vendors (not all inclusive) are:

- EDP/Colorflex <http://www.colorflex.com>
- NetC <http://www.netcllc.com>
- WrightLine/American Eagle Systems <http://www.americaneaglesys.com>
- Dataware <http://www.datawarelabels.com>

These Web sites contain links to third party sites. These links are provided as a convenience to you and not as an endorsement by Sun. Sun is not responsible for the content of these linked Web sites and does not make any representations regarding the content or accuracy of any content on such Web sites.

For technical questions, contact the Sales Support at:

Telephone: 1.800.ask4stk (1.800.275.4785)

E-mail: sales_support@storagetek.com.

Tape Drives

The following tables list the part numbers for the LTO, SDLT and DLT-S4 tape drives. The X-option tables list the numbers that allow you to do the following:

- Take a tape drive from a non-SL500 library and place it on the included SL500 tray.
- Convert a bundled LTO2 tape drive to an LTO3 tape drive.

Note – See [Appendix A](#) for more information about the specific tape drives, especially tape drive and cartridge readability issues.

TABLE 5-17 LTO2 Tape Drive Part Numbers

Hewlett-Packard (HP) Tape Drive Description	Part Number	
HP LTO2 FC, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-HPFC-SL500Z	□
HP LTO2 SCSI, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-HPSC-SL500Z	□
International Business Machines (IBM) Tape Drive Description	Part Number	
IBM LTO2 FC, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBFC-SL500Z	□
IBM LTO2 FC AS400, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBFCAS4-SL5Z	□
IBM LTO2 SCSI, 200 Gbyte capacity, 30 Mbyte/sec transfer rate	LTO2-IBSC-SL500Z	□
Note: Order the cables separately for these tape drives.		

TABLE 5-18 LTO3 Tape Drive Part Numbers

Hewlett-Packard Tape Drive Description	Part Number	
HP LTO3 FC, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HP2FC-SL500Z	□
HP LTO3 FC 4 Gbyte, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HP4FC-SL500Z	□
HP LTO3 SCSI, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-HPSC-SL500Z	□
International Business Machines (IBM) Tape Drive Description	Part Number	
IBM LTO3 FC 4 Gbyte, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-IB4FC-SL500Z	□
IBM LTO3 SCSI, 400 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO3-IBSC-SL500Z	□
Note: Order the cables separately for these tape drives.		

TABLE 5-19 LTO4 Tape Drive Part Numbers

Hewlett-Packard Tape Drive Description	Part Number	
HP LTO4 FC, 800 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO4-HPSC-SL500Z	□
HP LTO4 FC 4 Gbyte, 800 Gbyte capacity, 120 Mbyte/sec transfer rate	LTO4-HP4FC-SL500Z	□

TABLE 5-19 LTO4 Tape Drive Part Numbers (Continued)

International Business Machines (IBM) Tape Drive Description	Part Number	
IBM LTO4 FC 4 Gbyte, 800 Gbyte capacity, 120 Mbyte/sec transfer rate	LTO4-IB4FC-SL500Z	<input type="checkbox"/>
IBM LTO4 SCSI, 800 Gbyte capacity, 80 Mbyte/sec transfer rate	LTO4-IBSC-SL500Z	<input type="checkbox"/>
Notes: Order the cables separately for these tape drives. Check on availability for Gen 4 drives and media. LTO 4 drives are supported with library firmware 1126 and later.		

TABLE 5-20 LTO Tape Drive X-options (converting drives from another library)

Hewlett-Packard Tape Drive Description	X-option	
HP LTO2 FC L180/700 drive/tray to SL500	XLTO2-HPFC-SL5-CKZ	<input type="checkbox"/>
HP LTO3 FC L180/700 drive/tray to SL500	XLTO3-HPFC-SL5-CKZ	<input type="checkbox"/>
HP LTO2 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO2-HPSC-SL5-CKZ	<input type="checkbox"/>
HP LTO3 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO3-HPSC-SL5-CKZ	<input type="checkbox"/>
Changes a bundled HP LTO2 FC drive to an LTO3 drive <i>in the base module</i>	XSL500-L2-L3-FC-Z	<input type="checkbox"/>
Converts a bundled HP LTO2 SCSI drive to an LTO3 drive <i>in the base module</i>	XSL500-L2-L3-SC-Z	<input type="checkbox"/>
Adds second data port to HP LTO2 or LTO3 FC drive tray assembly	XL2-3HF-SL5-DPCKZ	<input type="checkbox"/>
IBM Tape Drive Description	X-option	
IBM LTO2 FC L180/700 drive/tray to SL500	XLTO2-IBFC-SL5-CKZ	<input type="checkbox"/>
IBM LTO2 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO2-IBSC-SL5-CKZ	<input type="checkbox"/>
IBM LTO3 FC L180/700 drive/tray to SL500	XLTO3-IBFC-SL5-CKZ	<input type="checkbox"/>
IBM LTO3 SCSI L20/40/80/180/700 drive/tray to SL500	XLTO3-IBSC-SL5-CKZ	<input type="checkbox"/>

Note – Your robotics unit must be part number 314558705 or higher to read SDLT/DLT-S4 cartridge labels.

TABLE 5-21 SDLT/DLT-S4 Tape Drive Part Numbers

SDLT 320 Tape Drive Description	Part Number	
SDLT 320 LVD SCSI, 160 Gbyte capacity, 16 Mbyte/sec transfer rate	SD320-SC-SL500-Z	<input type="checkbox"/>
SDLT 600 Tape Drive Description	Part Number	
SDLT 600 FC, 300 Gbyte native capacity, 36 Mbyte/sec transfer rate	SD600-FC-SL500-Z	<input type="checkbox"/>
SDLT 600 LVD SCSI, 300 Gbyte native capacity, 36 Mbyte/sec transfer rate	SD600-SC-SL500-Z	<input type="checkbox"/>
DLT-S4 Tape Drive Description	Part Number	
DLT-S4, FC, 800 Gbyte native capacity, 4 Gbyte/sec transfer rate	DLTS4-FC4G-SL500-Z	<input type="checkbox"/>
DLT-S4, LVD SCSI, 800 Gbyte native capacity, 60 Mbyte/sec transfer rate	DLTS4-SC-SL500-Z	<input type="checkbox"/>
Note: Order the cables separately for these tape drives.		

TABLE 5-22 SDLT Tape Drive X-options

SDLT 320 Tape Drive Description	X-options	
SDLT 320 SCSI L20/40/80/ drive/tray assembly to SL500	XS32-SC-LXX-S5-CKZ	<input type="checkbox"/>
SDLT 320 SCSI 180/700 drive/tray to SL500	XS3-SC-LXXX-S5-CKZ	<input type="checkbox"/>
SDLT 600 Tape Drive Description	X-options	
SDLT 600 FC L180/700 drive/tray to SL500	XS6-FC-LXXX-S5-CKZ	<input type="checkbox"/>
SDLT 600 SCSI L20/40/80 drive/tray to SL500	XS6-SC-LXX-S5-CKZ	<input type="checkbox"/>
SDLT 600 SCSI L180/700 drive/tray to SL500	XS6-SC-LXXX-S5-CKZ	<input type="checkbox"/>

Tape Drives and Cartridges

This appendix provides information about tape drives and cartridges. Refer to the vendor publications and Web sites for specific information not covered in this publication.

The library can have from 1 to 18 tape drives. The library supports:

- Linear Tape-Open (LTO) Ultrium tape drives:
 - Hewlett-Packard LTO Gen 2, 3 and 4 (Check on availability for Gen 4 Drives and media)* SCSI low voltage differential (LVD) and Fibre Channel (FC)
 - IBM LTO Gen 2, 3 and 4 (Check on availability for Gen 4 Drives and media) SCSI LVD and FC
- Quantum SDLT tape drives:
 - SDLT 320 SCSI LVD
 - SDLT 600 SCSI LVD and FC
 - DLT-S4 SCSI LVD and FC

LTO Tape Drives and Cartridges

This section discusses media compatibility and cartridge labels. For best results, match the cartridge type with the drive type (LTO 3 cartridges with Gen 3 drives, etc.).

The following table lists the compatibility issues among the various LTO cartridges and tape drives. Although SL500 does not support Gen 1 drives, the column is listed for you to consider if you need to migrate your data from older types of cartridges to newer ones.

TABLE A-1 LTO Media/Tape Drive Compatibility

Media	Label	Gen 1 Drive	Gen 2 Drive	Gen 3 Drive	Gen 4* Drive
LTO 1	L1	Read and write	Read and write	Read only	Read only
LTO 2	L2	Not applicable	Read and write	Read and write	Read only
LTO 3	L3	Not applicable	Not applicable	Read and write	Read and write
LTO 4*	L4	Not applicable	Not applicable	Read and write	Read and write

TABLE A-1 LTO Media/Tape Drive Compatibility (Continued)

Media	Label	Gen 1 Drive	Gen 2 Drive	Gen 3 Drive	Gen 4* Drive
WORM (400 GB)	LT	Not applicable	Not applicable	Read and write	Read and write
WORM (800 GB)	LU	Not applicable	Not applicable	Not applicable	Read and write
Note: LTO 4 drives are supported with library firmware 1126 and later.					

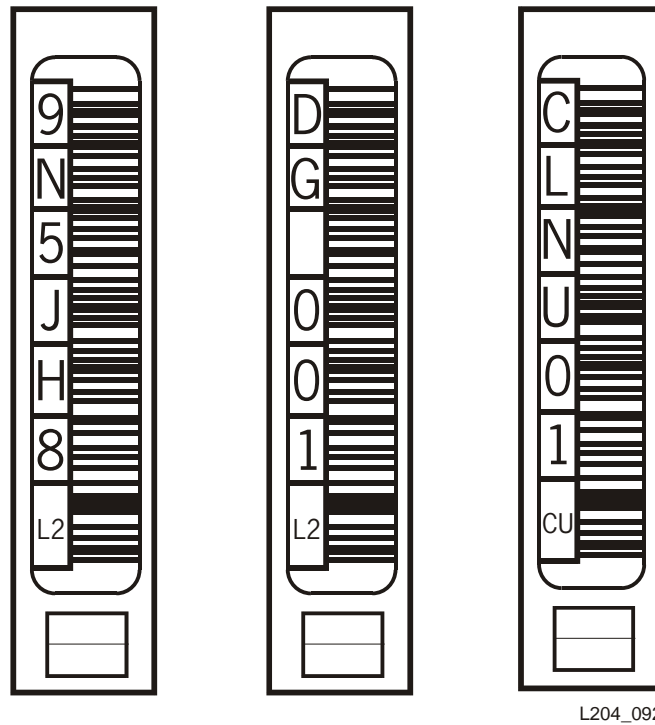
LTO cartridge labels have six or eight characters. The last two characters are the media ID (L1, L2, L3, L4, LT, or LU). CLN or DG are the first characters on the cleaning or diagnostic label, respectively. See [FIGURE A-1](#).

LTO 3 drives can accept 400 GB WORM (Write Once Read Many, label "LT") cartridges. LTO 4 drives can accept these cartridges plus 800 GB (label "LU") WORM cartridges.

Note – *Unlabeled cartridges are not supported.*

TABLE A-2 LTO Cartridge Codes

Label	Type of Cartridge
L1	Generation 1 data cartridge
L2	Generation 2 data cartridge
L3	Generation 3 data cartridge
L4	Generation 4 data cartridge
LT	Generation 3/4, 400 GB, Write once read many times (WORM*), cartridge
LU	Generation 4, 800 GB, Write once read many times (WORM*), cartridge
CLN plus CU	Universal cleaning cartridge The universal label is the preferred label instead of a vendor-unique label (CLN plus C1 for Hewlett-Packard or CLN plus C2 for IBM).
DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for library diagnostic tests)
* Note: This feature prevents the user from altering or erasing information from the tape. For more information, go to your vendor Web site and do a search on WORM.	

FIGURE A-1 LTO Cartridge Labels

Notes: Media codes for LTO3 labels are "L3" (data) and "LT" for 400 GB WORM.

Media codes for LTO4 labels are "L4" (data), "LT" for 400 GB WORM and "LU" for 800 GB WORM.

SDLT/DLT-S4 Tape Drives and Cartridges

Your robotics unit must be part number 314558705 or higher to read SDLT cartridge labels.

This section discusses media compatibility and cartridge labels. For best results:

- Use Super DLTtape 1 cartridges in SDLT 320 tape drives
- Use Super DLTtape 2 cartridges in SDLT 600 tape drives
- Use DLTtape S4 cartridges in DLT-S4 drives (*library firmware version 1126 or later required*)

The following table lists the compatibility issues among the various SDLT/DLT-S4 cartridges and tape drives. Consider the information if you need to migrate your data from older types of cartridges to newer ones.

TABLE A-3 SDLT/DLT-S4 Media/Tape Drive Compatibility

Media	SDLT 320 Drive	SDLT 600 Drive	DLT-S4 Drive
SDLT 1 media	Read and write	Read only	Read only
SDLT 2 media	No action	Read and write	Read only
DLTIV media	Read only	No action	No action
DLTtape S4 media	No action	No action	Read and write

SDLT600 tape drives with firmware major revision number 30 or greater and DLT-S4 tape drives can accept cartridges with the WORM feature. The WORM (write once read many times) feature prevents the user from altering or erasing information from the tape. For more information, go to the Quantum Web site and do a search on DLTICE™.

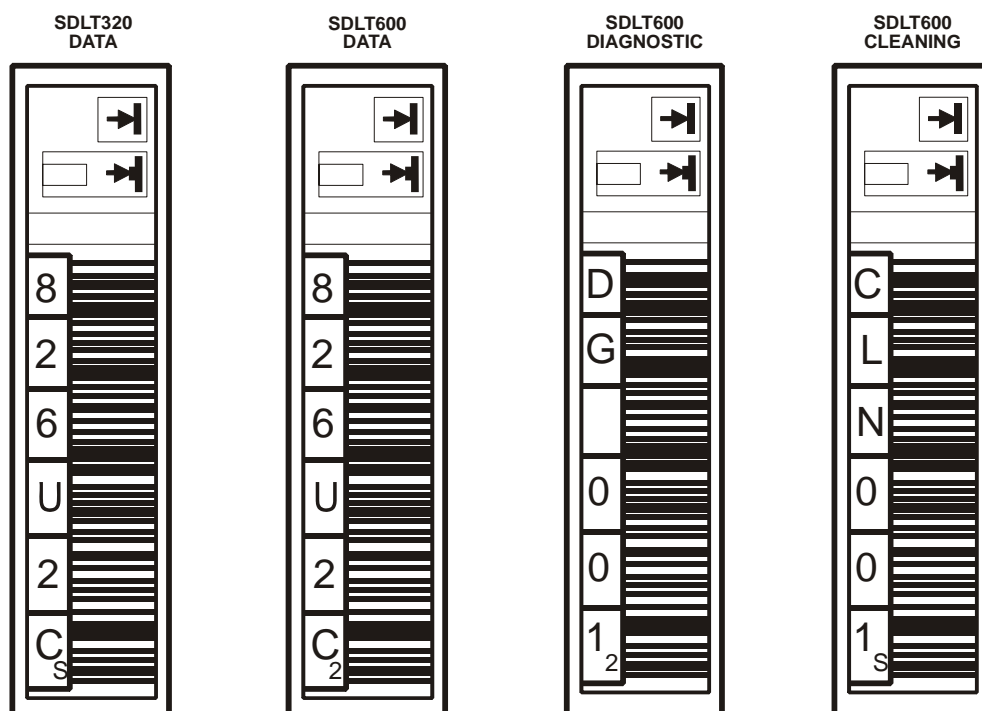
Note – The WORM feature can only be used with a cartridge that is unformatted native, blank native, or native with one filemark and an EOD.

SDLT/DLT-S4 cartridge labels have six or seven characters. The last character is the media ID (S or 2). CLN or DG are the first characters on the cleaning or diagnostic label.

TABLE A-4 SDLT/DLT-S4 Cartridge Codes

Label	Type of Cartridge
S	SDLT 220/320 data cartridge
2	SDLT 600 data cartridges
4	DLT-S4 data cartridges
CLN + S	SDLT/DLT-S4 cleaning cartridge.
DG + S	SDLT Diagnostic cartridge
DG + 4	DLT-S4 Diagnostic cartridge
Note: Apply a DG label to a blank data cartridge to be used for library diagnostic tests	

FIGURE A-2 SDLT/DLT-S4 Cartridge Labels



L204_574

Notes: DLTtape S4 media labels are identified by "4."

An SDLT cleaning tape is compatible with the DLT-S4 drive.

Ordering Cartridges

Cartridges are not shipped as part of the SL500 Modular Library System; they must be ordered separately *at least* two months before the installation. Sun does not sell labels separately from the cartridge tape.

The customers can use their existing cartridges as long as they are compatible with the supported tape drives (see previous pages) and are still within their warranty period.

Sun's Professional Services and Data Center Services offer transition support and services to help migrate media and drives.

Contact your authorized Selling Agent for StorageTek-branded labeled cartridges. You do not need to order labels separately, because the data cartridges have labels already, and the cleaning and diagnostic labels are shipped with the installation hardware. However, you must select the VOLSER range and other label options when ordering cartridges.

If you choose to order additional labels, order them from any standard media vendor. See ["Cartridges and Labels" on page 101](#).

Cartridges must meet specifications defined in *American National Standard Magnetic Tape and Cartridge for Information Interchange*, ACS X3B5.

Refer to your tape drive manufacturer's publication and Web site for specific cartridge requirements and specifications.

Color cartridges are approved only if the measured reflection density is greater than 0.1 as measured by an X-rite 404G color reflection densitometer. For more information about colored cartridges, contact your Sun marketing representative. Color measurements are:

Bandwidth	ANSI Status T Wide band (380 to 780 nm)
Measuring range	Density (0.00 to 2.50) D
Accuracy	±0.02 D
Repeatability	±0.01 D
Aperture diameter	3.4 mm (0.13 in.)

For technical questions, contact the Sales Support at:

Telephone: 1.800.ask4stk (1.800.275.4785)

E-mail: sales_support@storagetek.com.

Disclaimer

Media Usage:

The storage media (cartridge tapes) used in a tape drive and/or library can have a *significant* impact on the overall performance. The following is Sun's policy regarding tape storage media:

- Sun warrants tape storage media that is branded StorageTek.
- The customer is responsible for all expenses and costs related to the repair or replacement of hardware damaged by non-StorageTek branded tape storage media.
- The customer may be billed for any service provided by Sun resulting from or related to problems caused by non-StorageTek branded tape storage media.

Glossary

A

- access door** A door on the front of a library through which service personnel or operators can access the interior of the library. *Synonymous with* front door.
- adaptor card** *See* MPW card or MPU2 card.
- array** (1) A section of vertical or horizontal cartridge receptacles inside a library.
(2) A molded module that holds multiple cartridges.

B

- bar-code scanner** A component of the robot that is used for cartridge identification and position calibration.
- base module** The module in an SL500 library that contains the robotics unit and the base module.
- base unit** The assembly that houses the library backplane (RLM card), RLC card, interconnect cards, and one or two power supplies and drives.

C

- CAP** *See* cartridge access port.
- cartridge** A container holding magnetic tape that can be processed without separating the tape from the container.

The library uses data, diagnostic, and cleaning cartridges. These cartridges are not interchangeable.
- cartridge access port (CAP)** A device in the library that allows an operator to insert or remove cartridges during library operations.
- cartridge array** *See* array.
- cartridge expansion module** An optional module that adds cartridge storage slots to an SL500 library.
- cartridge tape** A container holding magnetic tape that can be processed without separating the tape from the container

cleaning cartridge A cartridge that contains special material to clean the tape path in a transport or drive.

LTO cleaning cartridges labels have “CLN” prefixes and media ID of CU.

D

data cartridge A term used to distinguish a cartridge onto which a tape drive may write data from a cartridge used for cleaning or diagnostic purposes.

diagnostic cartridge A data cartridge with a “DG” label that is used for diagnostic routines.

drive expansion module An optional module that adds cartridge storage slots and tape drive slots to an SL500 library

dWWN See dynamic World Wide Name.

dynamic World Wide

Name (dWWN) A feature that applies dynamic names to network devices rather than fixed names. When a dWWN-named device is replaced, it is assigned the same WWN as the one it replaced, preventing re-configuration of the network.

E

Ethernet A local-area, packet-switched network technology. Originally designed for coaxial cable, it is now found running over shielded, twisted-pair cable. Ethernet is a 10- or 100-megabytes-per-second LAN.

export The action in which the library places a cartridge into the cartridge access port so that the operator can remove the cartridge from the library. *Synonymous with* eject.

F

Fibre Channel A bidirectional, full-duplex, point-to-point, serial data channel structured for high performance capacity. The Fibre Channel is an interconnection of multiple communication ports, called N_Ports. These N_Ports are interconnected by a switching network, called a fabric, to a point-to-point link, or an arbitrated loop. Fibre Channel is a generalized transport mechanism with no protocol of its own. A Fibre Channel does not have a native input/output command set, but can transport existing Upper Level Protocols (ULP) such as SCSI and IPI. Fibre Channel operates at speeds of 200 MB per second. Fibre Channel operates over distances of up to 100 m over copper media or up to 10 km over optical links.

G

get An activity in which a robot obtains a cartridge from a slot or drive.

gripper The portion of the hand assembly that grasps and holds a cartridge.

H

hand assembly A part of the library robot whose function is to grasp cartridges and move them between storage slots and drives. A bar-code scanner on the hand assembly reads cartridge volume labels.

hot-swappable The capability that allows a component to be replaced while power to the component is maintained. This feature allows hardware maintenance actions and hardware upgrades to proceed without disrupting subsystem availability.

I

import The process of placing a cartridge into the cartridge access port so that the robot can insert it into a storage slot. *Synonymous with enter.*

interface card See MPW card, MPU2 card, or RLW card.

interlock switch A switch that disconnects power to library mechanisms, excluding tape drives, when the front door is opened.

L

library console The customer's operator panel that interfaces with the library. See StorageTek Library Console.

M

magazine A removable array that holds cartridges and is placed into the cartridge access port (CAP).

MPU2 card A Fibre Channel interface for the SL500 library.

MPW card A SCSI interface for the SL500 library.

O

opened Status indicating that software has made a CAP available for operator use. An LED is lit when a CAP is unlocked.

P

put An activity in which a robot places a cartridge into a slot or drive.

R

rack module (u) A standard measurement of vertical space inside a rack-mount cabinet. One U equals 44.5 mm (1.75 in.).

reach mechanism A component of the robot that moves the gripper to get or put a cartridge at a designated location.

reserved slots Configurable cartridge slots that are used only for cleaning and diagnostic cartridges.

retraction handle A handle used to manually retract the Z flex cable into its containment box.

RLC card The library controller card.

RLM card The backplane for the base module.

RLW card A SCSI interface for the SL500 library.

remote operator console See StorageTek Library Console.

- robot** A mechanism that transports cartridges to and from locations in the library.
- robotics unit** The module that includes the robotics components and that controls the movement of the robot between storage slots, drives, and CAPs.
- RU** Rack unit

S

- SL500** See StorageTek SL500 Modular Library System.
- SL500 audit** The process of reading and storing in SL500 library memory the VOLIDs and locations of all cartridges in the library. *See also* host audit.
- slot** The location in the library in which a cartridge is stored. *Synonymous with* cell.
- storage cell** See slot.
- StorageTek Library Console™** The remote operator panel software application used for the SL500.
- Sun StorageTek SL500 Modular Library System** An automated tape library composed of:
- Base module
 - Drive expansion module (optional)
 - Cartridge expansion module (optional)

T

- tape drive** An electromechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape.
- tape drive tray assembly** The mechanical structure that houses a tape drive, fan assembly, power and logic cards, cables, and connectors for data and logic cables. *Synonymous with* drive tray assembly.
- tape transport interface (TTI)** An interface to control/monitor tape drive operation.
- TTI** See tape transport interface.

V

- vacancy plate** A plate that covers an unused bay, such as a drive bay or power supply bay.

W

- wrist** A component of the hand assembly that rotates the hand horizontally.
- World Wide Name (WWN)** A 64-bit integer that identifies a Fibre Channel port. *See also* dynamic World Wide Name (dWWN).
- WWN** See World Wide Name.

X

- X carriage assembly** A component of the robotics unit that moves the robotic hand assembly to and from storage slots and tape drives.
- X flex cable** A signal cable that extends and retracts as the hand assembly moves forward and back on the X table.
- X table assembly** A component of the robotics unit that carries the hand assembly vertically between the library modules.
- X tray** *Synonymous with X table.*

Z

- Z drive assembly** A component of the robotics unit that moves the X table assembly vertically between the library modules.
- Z drive pulley** A component of the Z drive assembly used to move the X table assembly vertically along the Z pole to cartridge slots and drives.
- Z flex cable** The cable that carries control and power signals to the X table assembly. This cable automatically adjusts to the position of the X table assembly in library.
- Z pole** The device that guides the vertical movement of the X table assembly.
- Z reduction gear** The component of the Z drive assembly that controls the Z drive pulley.
- Z suspension cables** Four cables used to lift and lower the X table assembly between the library modules.

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